

Product Catalog

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Life Science Research **2015**



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New Products

Sample Preparation

Protein Sample Preparation

SureBeads™ Magnetic Beads System

Designed for bioseparation techniques like immunoprecipitation co-immunoprecipitation, and protein pull-down assays, SureBeads beads are superparamagnetic beads with surface-activated hydrophilic polymers and chemically conjugated protein A or protein G that specifically binds to the Fc region of immunoglobulin. This chemistry enables high IgG binding and low nonspecific binding from a variety of biological samples. **Page 2.**



Nucleic Acid Extraction and Purification

COMING SOON PureXtract™ Genomic DNA Extraction Kits

The PureXtract™ genomic DNA extraction kits are designed to purify high-quality total cellular DNA from a wide variety of starting materials. The PureXtract kits utilize the unique silica membrane technology PureBind™ to selectively bind nucleic acids and effectively eliminate proteins and other contaminants. **Page 11.**



COMING SOON PureXtract™ Plasmid Purification Kits

The PureXtract plasmid purification kits use unique PureBind™ spin column technology for the purification of high-quality plasmid DNA from bacterial cultures in less than 30 minutes for mini preps and 60 minutes for midi and maxi preps. **Page 13.**



COMING SOON PureXtract™ DNA Cleanup Kits

The PureXtract™ DNA cleanup kits provide fast and reliable purification of DNA fragments from gels and PCR and enzymatic reactions. These kits employ PureBind™ spin column technology to selectively bind nucleic acids and effectively remove impurities such as salts, nucleotides, enzymes, primers, and primer-dimers. **Page 15.**



COMING SOON QuickExtract™ DNA Extraction Solutions

The QuickExtract lysis buffers for DNA extraction provide a fast, simple, and economical method to extract PCR- or qPCR-ready genomic DNA from various samples, including eukaryotic and bacterial cells, animal, plant, and archival tissues, and seed samples. **Page 16.**



COMING SOON PureXtract™ RNA Extraction Kits

The PureXtract™ RNA extraction kits are designed to extract RNA from a wide range of starting materials. These kits employ the selective absorption property of the PureBind™ spin column technology, and allow the purification of total RNA in a short amount of time. Available for extraction of total RNA and miRNA. **Page 17.**

COMING SOON PureXtract™ Genomic DNA Removal Kit

The PureXtract™ DNA removal kit provides rapid and efficient removal of genomic DNA from total RNA and miRNA extractions. This kit is optimized for use with various PureXtract RNA extraction kits. **Page 20.**

COMING SOON PureXtract™ DNA/RNA Extraction Kits

The PureXtract™ DNA/RNA extraction kit allows the simultaneous extraction of both genomic DNA and total RNA from the same cultured eukaryotic cells or animal tissues in less than 40 minutes. **Page 20.**



Flow Cytometry

Cell Sorting Instruments

S3e™ Cell Sorter

The S3e cell sorter is a compact benchtop sorter equipped with one or two lasers and up to four fluorescence detectors plus forward and side scatter detection. ProDrop™ technology automates the drop delay calculation and droplet break-off monitoring. The S3e cell sorter includes the AutoGimbal™ system, which combines five picomotor controllers, imaging, and software algorithms to enable a hands-free automated process for nozzle tip and stream-to-optics alignment. **Page 44.**

**S3™ Biosafety System Class I**

The S3 Biosafety System Class I is an aerosol containment hood, custom designed for the S3 or S3e cell sorter, that provides users and the environment protection from aerosols created during the cell sorting process. The system adheres to the biosafety requirements of the International Society for Advancement of Cytometry (ISAC) for aerosol containment. **Page 47.**



Cell Sorting | Consumables

ProLine™ Universal Calibration Beads

ProLine universal calibration beads are designed to verify the alignment performance and determine the drop delay on any S3™ or S3e™ cell sorter with a 488, 488/561, or 488/640 nm laser configuration. **Page 48.**

**ProFlow™ Sort Grade 8x Sheath Fluid**

ProFlow sort grade 8x sheath fluid is a ready-to-use, sterile, endotoxin- and preservative-free phosphate buffered saline solution. The S3™ or S3e™ cell sorter employs its internal fluidics system to automatically dilute the sheath fluid. **Page 49.**



Reagents | Kits and Assays

VivaFix™ Cell Viability Assay

VivaFix cell viability assays provide a sensitive measurement for determining the viability of mammalian cells by flow cytometry, cell sorting, and microscopy. These assays efficiently distinguish between live and dead cells, providing at least a 100-fold difference in fluorescence intensity between the two populations. **Page 52.**



Cell Imaging

Cell Imaging | Instruments

ZOE™ Fluorescent Cell Imager

The ZOE fluorescent cell imager is a complete imaging system suitable for routine cell culture and imaging applications. An Android-based touch-screen interface is used to control brightfield, three fluorescence channels, and the integrated digital camera. This allows users to view cells, capture high-resolution images, and create multicolor merges. **Page 58.**



Cell Imaging | Reagents

PureBlu™ Hoechst 33342 Nuclear Staining Dye

PureBlu Hoechst 33342 dye permeates cell membranes and binds double-stranded DNA, which enables identification of nuclei within cells. It has a maximum excitation wavelength of 350 nm in the ultraviolet range and can be optimally detected in the blue channel with a maximum emission wavelength of 461 nm. **Page 59.**

PureBlu™ DAPI Nuclear Staining Dye

PureBlu DAPI dye permeates cell membranes and binds double-stranded DNA, which enables identification of nuclei within cells. It has a maximum excitation wavelength of 359 nm in the ultraviolet range and can be optimally detected in the blue channel with a maximum emission wavelength of 461 nm. **Page 60.**



Chromatography

Chromatography Resins

Nuvia™ IMAC Resin and Columns

Nuvia IMAC resin is a high-capacity next-generation affinity chromatography resin. The resin delivers high binding capacity over a range of pH and flow rates. Due to its superior mass transfer characteristics, Nuvia IMAC resin offers high capacity at high flow rates. It can be used under either nondenaturing or denaturing conditions. **Page 81.**

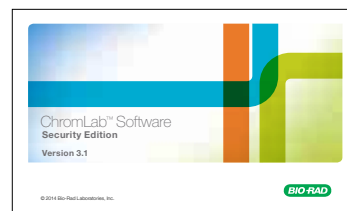
Medium Pressure Chromatography Systems

NGC Discover™ and Discover Pro

Both the NGC™ Discover and NGC Discover Pro chromatography systems are designed for higher throughput applications with rapid, robust automation for method development. Both systems include automated buffer blending and expanded scouting options and are ideal for the purification of proteins, peptides, and nucleic acids. **Page 123.**

NGC™ ChromLab™ Software

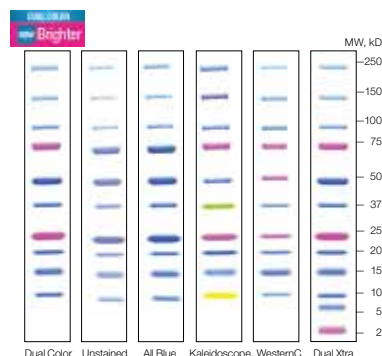
ChromLab 3.1 automates multistep tandem and 2D purification processes and enhances data collection and analysis, including use of a linear flow rate calculator. ChromLab software instrument controls are designed around a novel fluidics scheme interface that can be customized to exact hardware configurations. Available as the Standard or new Security Edition to facilitate 21 CFR Part 11 compliance. **Page 129.**



Electrophoresis and Blotting

New and Improved Dual Color Standard

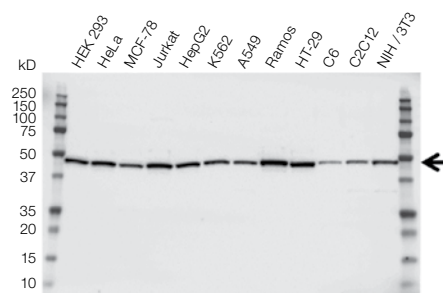
These new Precision Plus Protein™ Dual Color Standards are now brighter for easier identification of target proteins. They feature stronger band intensity throughout blot development and sharper resolution for more accurate molecular weight estimation. **Page 170.**



Antibodies

COMING SOON PrecisionAb™ Antibodies

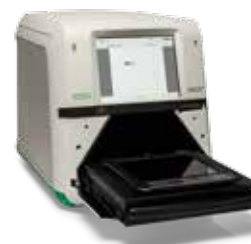
PrecisionAb antibodies are screened using Bio-Rad's V3 Western Workflow™ against 12 whole cell lysates expressing endogenous protein levels. Stringent validation and quality-control procedures ensure that PrecisionAb antibodies deliver industry-leading quality and performance. **Page 288.**



Imaging Instruments

ChemiDoc™ Touch Imaging System

The ChemiDoc Touch imaging system can be used for chemiluminescence and stain-free fluorescence detection and for general gel documentation applications. The system is optimized for stain-free visualization of gels and blots. ImageLab™ Touch software enhances performance for fast, integrated, and automated image capture of various samples. **Page 291.**



Bio-Plex Multiplex Systems

Assays

Bio-Plex Pro™ Human MMP and TIMP Assays

The Bio-Plex Pro assays for human matrix metalloproteinases (MMPs) and tissue inhibitors of matrix metalloproteinases (TIMPs) consist of panels of 9 MMPs and 4 TIMPs. These immunoassays are built on magnetic beads to enable robust quantification of multiple proteins in human samples.

Page 315.

Bio-Plex Pro™ RBM Human Metabolic and Hormone Panels

The Bio-Plex Pro RBM human metabolic and hormone panels, developed in partnership with Myriad RBM®, enable detection and quantitation of a highly relevant set of biomarkers involved in diabetes, obesity, metabolic syndrome, cardiovascular disease, and hormonal control of metabolism and reproductive organs. **Page 316.**

Bio-Plex Pro™ Human Inflammation Assays

For the first time, the most popular biomarkers of inflammation from the TNF superfamily proteins — IFN family proteins, Treg cytokines, and MMPs — can be measured using a single multiplex kit. The assays are available in larger 24-plex and 37-plex screening panels and a pathway-focused Treg 12-plex panel, along with singleplex and custom-configured assays. **Page 317.**



DNA Amplification/PCR

Digital PCR

COMING SOON ddPCR™ Supermix for Residual DNA Quantification

ddPCR supermix for residual DNA quantification is a ready-to-use 2x cocktail containing all components, except primers, probe(s), and template, required for probe-based detection of residual *E. coli*, CHO cells, mouse, or yeast DNA. **Page 362.**



ddPCR™ SMN1 and SMN2 Copy Number Determination Kits

The ddPCR *SMN1* and *SMN2* copy number determination kits can be used for copy number determination of the survival motor neuron 1 or 2 (*SMN1* or *SMN2*) genes. The kits contain a predesigned, wet-lab validated duplex assay, positive controls, and ddPCR supermix for probes (no dUTP). **Page 365.**



ddPCR™ KRAS Screening Multiplex Kit

The ddPCR *KRAS* screening multiplex screening kit can be used for screening for *KRAS* mutations including G12A, G12C, G12D, G12R, G12S, G12V, and G13D. The kit contains a predesigned, wet-lab validated multiplex assay and ddPCR supermix for probes (no dUTP). **Page 366.**

Real-Time qPCR Instruments

CFX Automation System II

The CFX automation system II is a robotic PCR plate handler designed to meet the high-throughput PCR requirements of today's drug discovery and screening workflows. It works with up to two CFX real-time PCR detection systems to enable walk-away, high-throughput qPCR operation. **Page 376.**



Real-Time qPCR Supermixes

SsoAdvanced™ Universal Inhibitor-Tolerant SYBR® Green Supermix

SsoAdvanced™ universal inhibitor-tolerant SYBR® Green supermix is a real-time PCR supermix based on Bio-Rad's patented* Sso7d fusion protein technology. This supermix is specifically formulated for use with difficult target sequences in a wide range of challenging sample types including crude lysates. **Page 383.**



SsoAdvanced™ PreAmp Supermix

SsoAdvanced PreAmp supermix is a 2x concentrated, ready-to-use reaction master mix optimized for unbiased, target-specific preamplification of cDNA and gDNA. This supermix preamplifies with as little as 100 pg of cDNA or gDNA template and is compatible with PrimePCR™ PreAmp assays, custom-designed assays, and TaqMan assays. **Page 384.**

Real-Time qPCR Kits

SingleShot™ Cell Lysis Kit

The SingleShot cell lysis kit rapidly generates cell lysates that are optimized for reverse transcription quantitative PCR (RT-qPCR) analysis without RNA purification. **Page 391.**



SingleShot™ One-Step and Two-Step Kits

SingleShot kits contain all the reagents needed for obtaining high-performance reverse transcription quantitative PCR (RT-qPCR) data directly from cell culture lysates in either a two-step or one-step workflow after cell lysis. Kits with SYBR® Green or probe chemistry are available. **Page 392.**



* U.S. patents 6,627,424; 7,541,170; and 7,560,260.



Sample Preparation

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Protein Sample Preparation

Magnetic Beads and Racks for Immunoprecipitation

See Also

Antibodies:
page 288.

Western blotting:
page 233.

Chemiluminescent
detection: page 290.

SureBeads™ Magnetic Beads System

SureBeads magnetic beads are designed for bioseparation techniques like immunoprecipitation (IP), co-immunoprecipitation (co-IP), and protein pull-down assays. SureBeads beads are superparamagnetic beads with surface activated hydrophilic polymers and chemically conjugated protein A or protein G that specifically bind to the Fc region of immunoglobulin. This chemistry enables high IgG binding and low nonspecific binding from a variety of biological samples.

Product features include:

- **Faster IP** — yes to magnetization, no to centrifugation
- **Easier IP** — ergonomically designed SureBeads magnetic rack magnetizes beads in seconds
- **Use less antibody** — patented* surface chemistry enables proper antibody orientation for optimal antigen binding
- **Reproducible** — consistent IgG binding capacity ensures accurate, reproducible results
- **Low cost to go magnetic** — priced similarly to leading agarose beads, and the 16-tube magnetic rack is included in the IP starter kit with two 3 ml vials of beads



* U.S. patent 20100105879A1.

For More Information

Web: www.bio-rad.com/immunoprecipitation
Request or download bulletin: 6560

Ordering Information

Catalog #	Description
1614013	SureBeads Protein A Magnetic Beads , 1 x 3 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension)
1614023	SureBeads Protein G Magnetic Beads , 1 x 3 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension)
1614011	SureBeads Protein A Magnetic Beads , 1 x 1 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension)
1614021	SureBeads Protein G Magnetic Beads , 1 x 1 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension)
1614916	16-Tube SureBeads Magnetic Rack , with separable magnets
1614811	SureBeads Trial Kit Protein A , 1 x 1 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension), 4-tube magnetic rack
1614821	SureBeads Trial Kit Protein G , 1 x 1 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension), 4-tube magnetic rack
1614833	SureBeads Starter Kit Protein A and G , 1 x 3 ml vial protein A and 1 x 3 ml vial protein G conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension), 16-tube magnetic rack
1614813	SureBeads Starter Kit Protein A , 2 x 3 ml vials protein A conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension), 16-tube magnetic rack
1614823	SureBeads Starter Kit Protein G , 2 x 3 ml vials protein G conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension), 16-tube magnetic rack

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
1632086	ReadyPrep Protein Extraction Kit (Total Protein), 20 preps

Kits for Cell Lysis

Cell Lysis Kits

These kits offer a gentle nondetergent solution to cell disruption and generate total protein samples that are ready to be applied to SDS-PAGE, IEF, and 2-D gel electrophoresis. 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). 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](http://www.bio-rad.com/bioplexcelllysis)

Request or download bulletins: 3033, 3034, and 5517



See Also

Protein assays:
page 30.

Protein Sample Preparation

Protein Sample Cleanup

www.bio-rad.com/proteinsampleprep

See Also

Protein assays:
page 30.

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 MicroRotor™ 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
1632141	Mammalian Cell Lysis Kit , 15 preps, includes 50 ml protein solubilization buffer (PSB), ReadyPrep mini grinders (2 packs of 10 each)
1632142	Plant Cell Lysis Kit , 10 preps, includes 50 ml protein solubilization buffer (PSB), ReadyPrep 2-D cleanup kit (50 reaction size)
1632143	Yeast Cell Lysis Kit , 15 preps, includes 50 ml protein solubilization buffer (PSB), 15 ml yeast suspension buffer, 2 x 0.5 ml lyticase (1.5 U/μl)
1632144	Bacterial Cell Lysis Kit , 15 preps, includes 50 ml protein solubilization buffer (PSB), 25 ml bacteria suspension buffer, 1 ml lysozyme (1,500 U/μl)

Cell Lysis Kit Components

1632145	Protein Solubilization Buffer (PSB) , makes 50 ml of solution
1632146	ReadyPrep Mini Grinders , includes 20 mini grinders, sufficient for twenty 100 mg extractions

Bio-Plex Cell Lysis Kits

171304011	Bio-Plex Cell Lysis Kit , 1 x 96-well, includes cell lysis and wash buffers, factor 1 and factor 2
171304012	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 (#1632130, #1632140)	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 page 26)	Removal of salts and other contaminants	Size exclusion chromatography	5 min	25, 100
Removal of Other Contaminants				
ReadyPrep 2-D cleanup kits (#1632130, #1632140)	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 (#1632090)	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

See Also

Bio-Spin gel filtration columns: page 26.

Micro Bio-Spin gel filtration columns: page 26.

Ordering Information

Catalog #	Description
ReadyPrep Kits	
1632130	ReadyPrep 2-D Cleanup Kit , 50 preps
1632140	ReadyPrep 2-D Cleanup Kit , 5 preps
1632105	ReadyPrep 2-D Starter Kit , includes 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 in kit)
1632090	ReadyPrep Reduction-Alkylation Kit , 100 preps
ReadyPrep Kit Components and Related Products	
1632091	ReadyPrep Proteomics Grade Water , 500 ml
1632083	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
1632106	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	
1610611	Dithiothreitol (DTT) , 5 g
1632101	Tributylphosphine (TBP) , 200 mM, 0.6 ml
1632109	Iodoacetamide , 30 g

* See the prepacked Bio-Spin and Micro Bio-Spin gel filtration columns on page 26.

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.

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 page 3.

For More Information

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

Ordering Information

Catalog #	Description
ReadyPrep Kits	
1632100	ReadyPrep Sequential Extraction Kit , 15 preps
1632085	ReadyPrep Protein Extraction Kit (Soluble/Insoluble) , 20 preps
ReadyPrep Kit Components and Related Products	
1632102	ReadyPrep Sequential Extraction Kit Reagent 1 , 50 ml, 40 mM Tris base
1632103	ReadyPrep Sequential Extraction Kit Reagent 2 , 10 ml, 8 M urea, 4% CHAPS, 40 mM Tris base, 0.2% Bio-Lyte 3/10 ampholyte
1632104	ReadyPrep Sequential Extraction Kit Reagent 3 , 10 ml, 5 M urea, 2 M thiourea, 2% CHAPS, 2% SB 3–10, 40 mM Tris base, 0.2% Bio-Lyte 3/10 ampholyte
1632083	ReadyPrep 2-D Rehydration/Sample Buffer 1

Protein Sample Preparation

Protein Fractionation

www.bio-rad.com/proteinsampleprep

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
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ReadyPrep Kits

1632089	ReadyPrep Protein Extraction Kit (Cytoplasmic/Nuclear), 50 preps
1632088	ReadyPrep Protein Extraction Kit (Membrane I), 50 preps
1632084	ReadyPrep Protein Extraction Kit (Membrane II), 10 preps
1632087	ReadyPrep Protein Extraction Kit (Signal), 50 preps

Related Products

1632083	ReadyPrep 2-D Rehydration/Sample Buffer 1
1632085	ReadyPrep Protein Extraction Kit (Soluble/Insoluble), 20 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
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7326703	Aurum CEX Mini Columns, 25 pack
7326706	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).

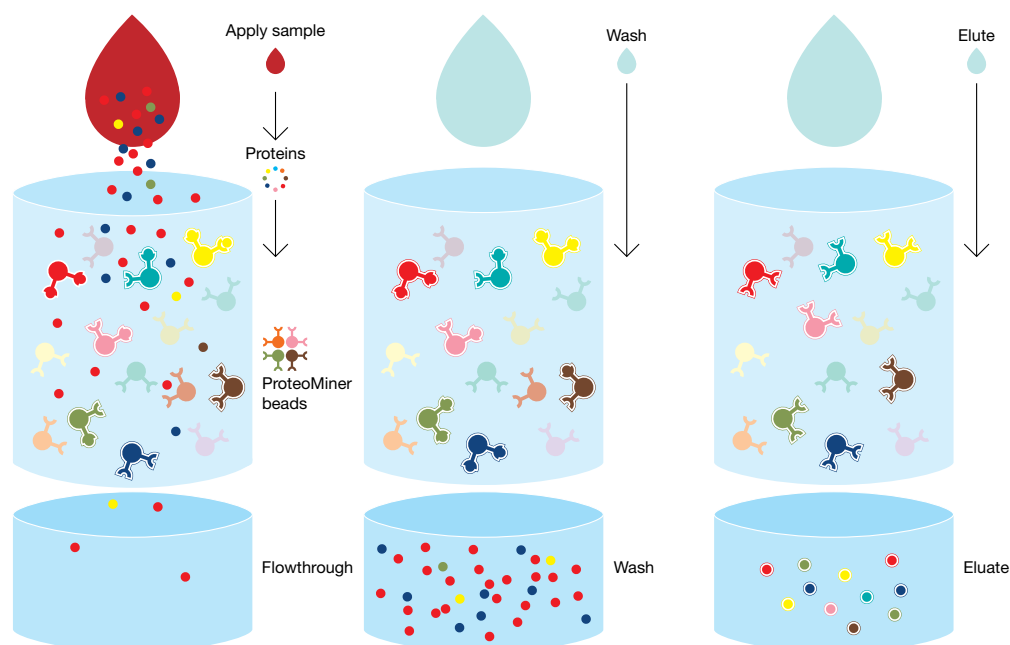
ProteoMiner™ Protein Enrichment System

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 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.

Protein Sample Preparation

Protein Depletion

www.bio-rad.com/proteinsampleprep

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
1633006	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
1633007	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
1633008	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
1633009	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	
1633010	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
1633011	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	
1633003	ProteoMiner Sequential Elution Reagents , 10 preps, includes reagents only (columns not included), to be used with #1633006 or #1633007
7326207	Mini Bio-Spin Chromatography Columns , empty, 100

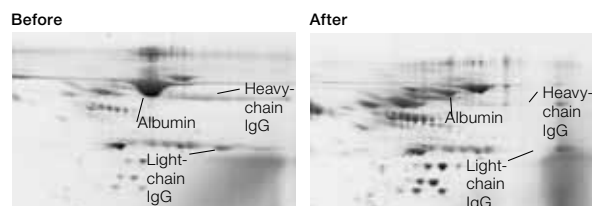
Aurum™ Kits and Columns

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
7326701	Aurum Serum Protein Mini Kit , 10 pack, includes columns and buffers
7326708	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	
C5730080	ProteinChip Q10 Arrays, A-H format, 12
C5730075	ProteinChip CM10 Arrays, A-H format, 12
C5730078	ProteinChip IMAC30 Arrays, A-H format, 12
C5730065	ProteinChip H50 Arrays, A-H format, 12
C5730028	ProteinChip H4 Arrays, A-H format, 12
C5730081	ProteinChip SEND ID Arrays, A-H format, 12
C5730043	ProteinChip NP20 Arrays, A-H format, 12
C5530058	ProteinChip PG20 Array, A-H format
C5530044	ProteinChip PS10 Arrays, A-H format, 12
C5730045	ProteinChip PS20 Arrays, A-H format, 12
C5530082	ProteinChip RS100 Arrays, A-H format, 6
C5530033	ProteinChip Gold Array, A-H format
C2010001	ProteinChip Array Reaction Tubes, 50

continues

Protein Sample Preparation

Surface-Enhanced Laser Desorption/Ionization

www.bio-rad.com/proteinchip

Ordering Information

Catalog #	Description
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ProteinChip Arrays and Array Preparation (cont.)

C5030011	ProteinChip Cassette-Compatible Bioprocessor , includes cassette hold-down frame, 12 blank ProteinChip arrays
C5030012	ProteinChip Cassette-Compatible Bioprocessor Reservoirs , 5
C5030013	ProteinChip Cassettes , empty, hold 12 ProteinChip arrays, 5
C3000001	ProteinChip CHCA Matrix , 5 mg/vial, 20
C3000002	ProteinChip SPA Matrix , 5 mg/vial, 20
C3000003	ProteinChip EAM-1 Matrix , 5 mg/vial, 20
C3000004	ProteinChip Matrix Kit , includes 6 vials each CHCA, SPA, and EAM-1 matrix
C1000005	ProteinChip All-In-One Peptide Standard , lyophilized, 100 spots
C1000007	ProteinChip All-In-One Protein Standard II , lyophilized, 100 spots
C1000002	ProteinChip Peptide Calibrant Kit , includes peptide MW standards (2 sets of 7 standards)
C1000001	ProteinChip Protein Calibrant Kit , includes protein MW standards (2 sets of 10 standards)

ProteinChip Kits

C7000080	ProteinChip OQ Kit , includes 2 detector calibration arrays, 6 detector qualification arrays, 2 peptide standard arrays, CD with protocols
C7000081	ProteinChip System Check Kit , includes 1 detector calibration array, 1 detector qualification array, 1 peptide standard array, CD with protocols
C7000082	ProteinChip Detector Calibration Kit , includes 1 detector calibration array
C7000070	ProteinChip Peptide Mass Calibration Kit , sufficient for up to 160 calibrations, includes 1 ProteinChip peptide standard array, CD-ROM with video tutorial and protocol

ProteinChip SELDI System Software

SW3040050	ProteinChip Data Manager Software 4, Desktop Edition , includes 1-user network license, no instrument control
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Nucleic Acid Extraction and Purification

DNA Extraction Kits

Bio-Rad offers a broad range of products for the isolation of genomic and plasmid DNA in scalable and high-throughput formats.

Coming Soon Genomic DNA Extraction Kits

The PureExtract™ genomic DNA extraction kits are designed to purify high-quality total cellular DNA from a wide variety of starting materials, including cultured eukaryotic cells, animal, plant, and archival tissues, and blood, soil, and stool samples. The PureExtract kits utilize the unique silica membrane technology, PureBind™, to selectively bind nucleic acids and effectively eliminate proteins and other contaminants. The purified DNA is suitable for a variety of downstream applications, including PCR, quantitative real-time PCR, Southern blotting, sequencing, hybridization techniques, and restriction enzyme digestion.

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



Selection Guide for PureExtract Genomic DNA Extraction Kits

Kit	Format	Total Prep Time*	Sample Input	Yield**
Blood and tissue DNA kit	Silica column (spin)	<30 min	<ul style="list-style-type: none">Up to 250 µl whole bloodUp to 30 mg animal tissueUp to 30 mg FFPE tissueUp to 2 x 0.6 cm mouse tailUp to 5 x 10⁶ cultured cells	<ul style="list-style-type: none">4–12 µg from 200 µl whole blood15–25 µg from 20 mg mouse tail13–22 µg from 20 mg liver5–6 µg from 1 x 10⁶ HeLa cells
Blood DNA midi kit	Silica column (spin/vacuum)	1.5 hr for 2 ml 2.75 hr for 10 ml	0.2–10 ml of <ul style="list-style-type: none">Whole blood treated with anticoagulantBuffy coatLymphocytesSerumPlasmaBone marrow	<ul style="list-style-type: none">60–80 µg from 2 ml whole bloodUp to 400 µg from 10 ml whole blood
Blood DNA maxi kit	Silica column (spin/vacuum)	1.5 hr for 10 ml 3.5 hr for 10–20 ml	Up to 20 ml of <ul style="list-style-type: none">Whole blood treated with anticoagulantBuffy coatLymphocytesSerumPlasmaBone marrow	<ul style="list-style-type: none">Up to 400 µg from 10 ml whole blood

continues

Nucleic Acid Extraction and Purification

DNA Extraction Kits

www.bio-rad.com/nasampleprep

Selection Guide for PureXtract Genomic DNA Extraction Kits, cont.

Kit	Format	Total Prep Time*	Sample Input	Yield**
FFPE DNA kit	Silica column (spin/vacuum)	<5.5 hr (including lysis)	<ul style="list-style-type: none"> Up to 30 mg FFPE tissue 3–4 fresh cut 5–10 µm FFPE tissue sections 	Up to 50 µg
Plant DNA kit	Silica column (spin)	<45 min	<ul style="list-style-type: none"> Up to 30 mg dry plant tissue Up to 100 mg fresh/frozen plant tissue 	5–50 µg from 30 mg dry plant tissue 3–30 µg from 100 mg fresh/frozen plant tissue
Soil DNA kit	Silica column (spin)	<60 min	Up to 1 g soil sample	Varies
Stool DNA kit	Silica column (spin)	<60 min	Up to 200 mg stool sample	Varies

* Total prep time will vary depending on the starting material and on the format (spin or vacuum) used.

** Yields will vary depending on the sample type.

Ordering Information

Catalog #	Description
7332041	PureXtract Blood and Tissue DNA Kit, 50 preps
7332042	PureXtract Blood and Tissue DNA Kit, 200 preps
7332221	PureXtract Blood DNA Midi Kit, 100 preps
7332231	PureXtract Blood DNA Maxi Kit, 50 preps
7332071	PureXtract FFPE DNA Kit, 50 preps
7332081	PureXtract Plant DNA Kit, 50 preps
7332082	PureXtract Plant DNA Kit, 200 preps
7332101	PureXtract Soil DNA Kit, 50 preps
7332111	PureXtract Stool DNA Kit, 50 preps

Coming Soon Plasmid Purification Kits

The PureXtract™ plasmid purification kits are designed for the convenient, rapid purification of plasmid DNA from 1–200 ml bacterial culture volume. The PureXtract kits use the unique PureBind™ spin column technology for the purification of high-quality plasmid DNA in less than 30 minutes for mini preps and 60 minutes for midi and maxi preps. The purified plasmid DNA is suitable for a variety of downstream applications, including restriction enzyme digestion, PCR, sequencing, and cloning.

For More Information

Web: www.bio-rad.com/plasmidpurification



Selection Guide for PureXtract Plasmid Purification Kits

Kit	Format	Total Prep Time*	Sample Input	Yield**
Plasmid DNA mini kit	Silica column (spin/column)	<30 min	1–5 ml bacterial culture	Up to 30 µg
Plasmid DNA midi kit	Silica column (spin/column)	<60 min***	20–50 ml bacterial culture	100–250 µg high-copy plasmid 10–50 µg low-copy plasmid
Plasmid DNA maxi kit	Silica column (spin/column)	<60 min***	50–200 ml bacterial culture	600–1,200 µg high-copy plasmid 50–300 µg low-copy plasmid

* Total prep time will vary depending on the starting material and on the format (spin or vacuum) used.

** Yields will vary depending on the sample type.

*** When performed with vacuum protocol

Ordering Information

Catalog #	Description
7332411	PureXtract Plasmid Mini Kit, 50 preps
7332412	PureXtract Plasmid Mini Kit, 200 preps
7332421	PureXtract Plasmid Midi Kit, 25 preps
7332422	PureXtract Plasmid Midi Kit, 100 preps
7332431	PureXtract Plasmid Maxi Kit, 20 preps
7332432	PureXtract Plasmid Maxi Kit, 100 preps

Nucleic Acid Extraction and Purification

DNA Extraction Kits

www.bio-rad.com/nasampleprep

Coming Soon 96-Well DNA Extraction Kits

The PureXtract™ 96-well DNA extraction kits provide high-throughput purification of high-quality total cellular or plasmid DNA from a variety of starting materials. With the unique PureBind™ technology, the PureXtract 96 kits selectively bind nucleic acids and effectively eliminate proteins and other contaminants in a 96-well plate format. The purified genomic and plasmid DNA can be used for various downstream applications, including PCR, quantitative real-time PCR, cloning, restriction enzyme digestion, sequencing, and hybridization applications.



For More Information

Web: www.bio-rad.com/genomicDNAextraction
and www.bio-rad.com/plasmidpurification

Selection Guide for 96-Well DNA Extraction Kits

Kit	Format	Total Prep Time*	Sample Input	Yield**
96 blood and tissue DNA kit	Silica 96-well plate (spin/vacuum)	<70 min	<ul style="list-style-type: none"> Up to 250 µl whole blood Up to 30 mg animal tissue Up to 30 mg FFPE tissue Up to 2 x 0.6 cm mouse tail Up to 5 x 10⁸ cultured cells 	Up to 30 µg
96 plant DNA kit	Silica 96-well plate (spin/vacuum)	<90 min	<ul style="list-style-type: none"> Up to 15 mg dry plant tissue Up to 50 mg fresh/frozen plant tissue 	<ul style="list-style-type: none"> 5–30 µg from 15 mg dry plant tissue 3–20 µg from 50 mg fresh/frozen plant tissue
96 plasmid mini kit	Silica 96-well plate (spin/vacuum)	<90 min	Up to 1.5 ml bacterial culture	10–15 µg high-copy plasmid from 1 ml bacterial culture

* Total prep time will vary depending on the starting material and on the format (spin or vacuum) used.

** Yields will vary depending on the sample type.

Ordering Information

Catalog #	Description
7332047	PureXtract 96 Blood and Tissue DNA Kit, 1 x 96 preps
7332048	PureXtract 96 Blood and Tissue DNA Kit, 4 x 96 preps
7332087	PureXtract 96 Plant DNA Kit, 1 x 96 preps
7332088	PureXtract 96 Plant DNA Kit, 4 x 96 preps
7332417	PureXtract 96 Plasmid Mini Kit, 1 x 96 preps
7332418	PureXtract 96 Plasmid Mini Kit, 4 x 96 preps

DNA Cleanup Kits

Coming Soon DNA Cleanup Kits

The PureXtract™ DNA cleanup kits provide fast and reliable purification of DNA fragments from gels and PCR and enzymatic reactions. The PureXtract DNA purification kits employ the unique PureBind™ spin column technology to selectively bind nucleic acids and effectively remove impurities such as salts, nucleotides, enzymes, primers, and primer-dimers. The purified DNA is ready for a variety of downstream applications, including PCR, cloning, ligations, sequencing, restriction enzyme digestion, and various labeling reactions.

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



Selection Guide for PureXtract Purifications Kits

Kit	Format	Total Prep Time*	Sample Input	Yield**
Gel extraction kit	Silica column (spin/vacuum)	<10 min	Up to 1 g agarose gel slice	>85% recovery of 70 bp–20 kb fragments
PCR purification kit	Silica column (spin/vacuum)	<10 min	Varies	>80% recovery of 100 bp–10 kb fragments

* Total prep time will vary depending on the starting material and on the format (spin or vacuum) used.
** Yields will vary depending on the sample type.

Ordering Information

Catalog #	Description
7332611	PureXtract PCR Purification Kit, 50 preps
7332612	PureXtract PCR Purification Kit, 200 preps
7332621	PureXtract Gel Extraction Kit, 50 preps
7332622	PureXtract Gel Extraction Kit, 200 preps

Lysis Buffers for DNA Extraction

Coming Soon QuickExtract™ DNA Extraction Solutions

The QuickExtract lysis buffers for DNA extraction provide a fast, simple, and economical method to extract PCR- or qPCR-ready genomic DNA from various samples, including eukaryotic and bacterial cells, animal, plant, and archival tissues, and seed samples. The DNA lysate obtained can be directly used for many downstream applications, such as:

- PCR
- Real-time PCR
- Genotyping
- Genetic studies
- Identity testing
- Viral/microbial screening
- GMO testing
- Copy number variation (CNV)
- Single nucleotide polymorphism (SNP)
- Short tandem repeats (STR)



- Pulse-field gel electrophoresis (PFGE)
- Restriction digestion
- Optical mapping

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

Selection Guide for QuickExtract DNA Extraction Solutions

Kit	Format	Total Prep Time*	Sample Input
DNA extraction solution	Single tube lysis reagent	<8 min	<ul style="list-style-type: none"> ▪ Up to 10⁶ counted human cervical carcinoma tissue culture (HeLa) cells ▪ 0.5–1 cm region of a single plucked human hair with follicle ▪ 0.5–1 cm section of a mouse tail snip, finely diced using a fresh blade ▪ One single <i>E. coli</i> colony picked from a plate ▪ 0.5–1 cm quill-end of a breast feather that was plucked and stored at 4°C
FFPE DNA extraction solution	Single tube lysis reagent	60 min	<ul style="list-style-type: none"> ▪ 10–50 mg of FFPE tissue ▪ Three 5–10 µm thick FFPE sections
Plant DNA extraction solution	Single tube lysis reagent	<8 min	3–5 mm leaf disc of <i>Arabidopsis</i> , barley, maize, emmer, pepper, rice, spelt, spinach, soybeans, or wheat
Seed DNA extraction solution	Single tube lysis reagent	<8 min	Up to 10 mg sample of apple, cotton, sunflower, tomato, barley, maize, oats, rice, rye, or wheat seeds
Bacterial DNA extraction kit	Single tube lysis reagent	<15 min	Up to 10 ⁸ gram-positive or gram-negative bacteria

* Total prep time will vary depending on the starting material.

Ordering Information

Catalog # Description

7342021	QuickExtract DNA Extraction Solution , 5 ml, 10 preps
7342025	QuickExtract DNA Extraction Solution , 50 ml, 100 preps
7342071	QuickExtract FFPE DNA Extraction Solution , 5 ml, 50 preps
7342075	QuickExtract FFPE DNA Extraction Solution , 50 ml, 500 preps
7342081	QuickExtract Plant DNA Extraction Solution , 5 ml, 50 preps
7342085	QuickExtract Plant DNA Extraction Solution , 50 ml, 500 preps
7342091	QuickExtract Seed DNA Extraction Solution , 5 ml, 50 preps
7342095	QuickExtract Seed DNA Extraction Solution , 50 ml, 500 preps
7342411	QuickExtract Bacterial DNA Extraction Kit , 5 ml, 50 preps
7342415	QuickExtract Bacterial DNA Extraction Kit , 50 ml, 500 preps

RNA Extraction Kits

A broad range of RNA extraction kits are available for the isolation of micro (<200 nt) and large (>200 nt) total RNA in standard spin column and 96-well high-throughput formats.

Coming Soon Total RNA Extraction Kits

The PureXtract™ total RNA extraction kits are designed to extract total RNA larger than 200 nt from a wide range of starting materials, including cultured eukaryotic cells, animal, plant, and archival tissues, and blood and soil samples. The PureXtract kits, employing the selective absorption property of the unique PureBind™ spin column technology, allow the purification of total RNA in a short amount of time. The purified RNA is suitable for a variety of downstream applications, including reverse transcription PCR (RT-PCR), quantitative real-time PCR, northern blotting, poly A+ RNA purification, nuclease protection, and in vitro translation.



For More Information

Web: www.bio-rad.com/totalRNAextraction

Selection Guide for PureXtract Total RNA Extraction Kits

Kit	Format	Total Prep Time*	Sample Input	Yield**
Total RNA kit	Silica column (spin/vacuum)	<60 min	<ul style="list-style-type: none"> Up to 1×10^6–10^7 cultured cells Up to 30 mg animal tissue 	<ul style="list-style-type: none"> 10–15 µg from 1×10^6 cultured cells 5–45 µg from 10 mg animal tissue
Fatty and fibrous tissue RNA kit	Silica column (spin/vacuum)	<60 min	Up to 30 mg fatty or fibrous animal tissue	Up to 45 µg
Blood RNA kit	Silica column (spin)	2 hr	<ul style="list-style-type: none"> Up to 1 ml whole blood treated with anticoagulant Up to 10 mg animal tissue 	1–5 µg from 1 ml blood
PXG blood RNA kit	Silica column (spin)	<75 min	Up to 2.5 ml blood stored in PAXgene tube	7–12 µg
FFPE RNA kit	Silica column (spin)	<2.5 h	<ul style="list-style-type: none"> Up to 30 mg FFPE tissue 3–4 fresh cut 5–10 µm FFPE tissue sections 	1–5 µg
Plant RNA kit	Silica column (spin)	<90 min	<ul style="list-style-type: none"> Up to 100 mg plant tissue 0.5–40 mg seed tissue 	Up to 100 µg
Soil RNA kit	Silica column (spin)	<30 min	Up to 500 mg soil sample	Varies
MiniElute total RNA kit	Silica column (spin)	<30 min	<ul style="list-style-type: none"> Up to 5×10^6 cultured cells Up to 5 mg animal tissue Up to 5 mg laser dissected or fine needle aspirates 	Up to 50 µg

* Total prep time will vary depending on the starting material and on the format (spin or vacuum) used.

** Yields will vary depending on the sample type.

Nucleic Acid Extraction and Purification

RNA Extraction Kits

www.bio-rad.com/nasampleprep

Ordering Information

Catalog #	Description
7331021	PureXtract Total RNA Kit, 50 preps
7331022	PureXtract Total RNA Kit, 200 preps
7331051	PureXtract miElute Total RNA Kit, 50 preps
7331031	PureXtract Fatty and Fibrous Tissue RNA Kit, 50 preps
7331071	PureXtract FFPE RNA Kit, 50 preps
7331081	PureXtract Plant RNA Kit, 50 preps
7331101	PureXtract Soil RNA Kit, 50 preps
7331211	PureXtract Blood RNA Kit, 50 preps
7331241	PureXtract PXG Blood RNA Kit, 50 preps

Coming Soon miRNA Extraction Kits

The PureXtract™ miRNA extraction kits effectively extract up to 50 µg of micro and large RNA from various starting materials, including cultured eukaryotic and bacterial cells and animal, plant, and fungal tissues. The silica membrane-based PureBind™ technology allows the extraction of miRNA in less than 30 minutes. The purified DNA-free RNA can be used for a variety of downstream applications, including reverse transcription PCR (RT-PCR), quantitative real-time PCR, RNA sequencing, northern blotting, and nuclease protection assays.

For More Information

Web: www.bio-rad.com/miRNAextraction



Selection Guide for PureXtract miRNA Extraction Kits

Kit	Format	Total Prep Time*	Sample Input	Yield**
miRNA kit	Silica column (spin)	<30 min	<ul style="list-style-type: none"> Up to 1 x 10⁶ cultured cells Up to 1 x 10⁹ bacterial cells Up to 50 mg animal tissue Up to 100 mg plant tissue 	Up to 50 µg
Phenol-free miRNA kit	Silica column (spin)	<30 min	<ul style="list-style-type: none"> Up to 1 x 10⁶ cultured cells Up to 1 x 10⁹ bacterial cells Up to 50 mg animal tissue Up to 100 mg plant tissue 	Up to 50 µg

* Total prep time will vary depending on the starting material and on the format (spin or vacuum) used.

** Yields will vary depending on the sample type.

Ordering Information

Catalog #	Description
7334021	PureXtract miRNA Kit, 50 preps
7334061	PureXtract Phenol-Free miRNA Kit, 50 preps

Coming Soon 96-Well Total RNA Extraction Kits

The PureXtract™ 96-well total RNA extraction kits provide high-throughput extraction of total RNA from cultured eukaryotic cells and plant and seed tissues. The PureXtract 96 kits utilize the unique PureBind™ technology allowing the purification of high-quality total RNA in a 96-well plate format in less than one hour. The purified RNA can be used for a variety of downstream applications, including reverse transcription PCR (RT-PCR), quantitative real-time PCR, northern blotting, differential analysis, and microarrays.

For More Information

Web: www.bio-rad.com/totalRNAextraction



Selection Guide for PureXtract 96 Total RNA Extraction Kits

Kit	Format	Total Prep Time*	Sample Input	Yield**
96 total RNA extraction kit	Silica 96-well plate (spin/vacuum)	<60 min	<ul style="list-style-type: none">Up to 1 x 10⁶ cultured cellsUp to 10 mg animal tissue	5–20 µg
96 plant RNA kit	Silica 96-well plate (spin)	<60 min	<ul style="list-style-type: none">Up to 100 mg plant tissue0.5–40 mg seed tissue	5–65 µg from 100 mg plant tissue

* Total prep time will vary depending on the starting material and on the format (spin or vacuum) used.

** Yields will vary depending on the sample type.

Ordering Information

Catalog #	Description
7331027	PureXtract 96 Total RNA Kit, 1 x 96 preps
7331028	PureXtract 96 Total RNA Kit, 4 x 96 preps
7331087	PureXtract 96 Plant RNA Kit, 2 x 96 preps

Nucleic Acid Extraction and Purification

DNA/RNA Extraction Kits

www.bio-rad.com/nasampleprep

Coming Soon Genomic DNA Removal Kit

The PureXtract™ DNA removal kit provides rapid and efficient removal of genomic DNA from total RNA and miRNA extractions. This kit is optimized for use with various PureXtract RNA extraction kits featuring an optional on-column DNase digestion. DNase I digest is not required for RNA purified with the PureXtract kits as the unique PureBind™ spin column technology efficiently removes genomic DNA without enzymatic digestion. However, an optional on-column DNase digest can be performed to remove any remaining DNA for sensitive RNA applications.

For More Information

Web: www.bio-rad.com/DNAremoval



Ordering Information

Catalog #	Description
7335011	PureXtract DNA Removal Kit, 50 preps
7335012	PureXtract DNA Removal Kit, 200 preps

DNA/RNA Extraction Kits

Coming Soon DNA/RNA Extraction Kits

The PureXtract™ DNA/RNA extraction kit allows the simultaneous extraction of both genomic DNA and total RNA from the same cultured eukaryotic cells or animal tissues in less than 40 minutes. This kit uses the unique PureBind™ technology to selectively bind nucleic acids and effectively eliminate proteins and other contaminants. The purified RNA is suitable for a variety of downstream applications, including RT-PCR, quantitative real-time PCR, northern blotting, poly(A)+ RNA purification, nuclease protection, and in vitro translation. The purified DNA is ready for PCR, quantitative real-time PCR, Southern blotting, sequencing, hybridization techniques, and restriction enzyme digestion.

For More Information

Web: www.bio-rad.com/DNARNAextraction



Ordering Information

Catalog #	Description
7333021	PureXtract DNA/RNA Kit, 50 preps

Nucleic Acid Sample Preparation

RNA Extraction Reagents

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

See Also

Lipid transfection reagents: page 347.

DNA amplification/PCR: page 360.

Ordering Information

Catalog #	Description
7326880	PureZOL RNA Isolation Reagent, 50 ml
7326890	PureZOL RNA Isolation Reagent, 100 ml

Nucleic Acid Sample Preparation

RNA Extraction Reagents

www.bio-rad.com/nasampleprep

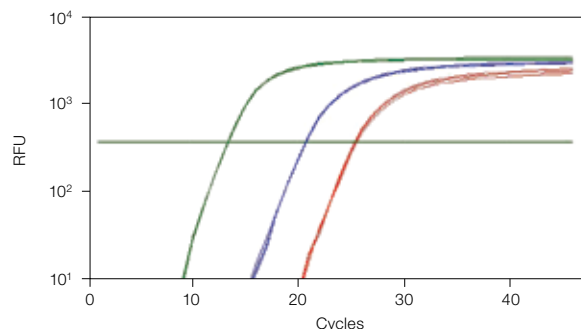
iScript™ RT-qPCR Sample Preparation Reagent

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.

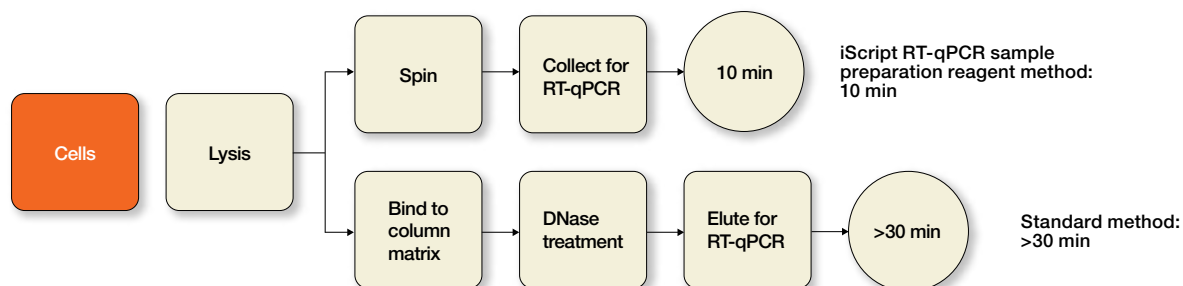
- Rapid protocol (5–10 min) efficiently stabilizes RNA
- Sensitive detection of high, medium, and low copy number gene targets directly from cell lysates
- Reagent enables multiplex qPCR detection of up to 4 targets from as few as 10 cells

For More Information

Web: www.bio-rad.com/iscript-sampleprep
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/ μ l 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
1708898	iScript RT-qPCR Sample Preparation Reagent , 100 reactions, 10 ml, contains RNase inhibitors and RNA stabilizers
1708899	iScript RT-qPCR Sample Preparation Reagent , 500 reactions, 5 x 10 ml, contains RNase inhibitors and RNA stabilizers

Nucleic Acid Sample Preparation Consumables

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:

- Automated 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



See Also

Lipid transfection reagents:
page 347.

DNA amplification/PCR:
page 360.

Ordering Information

Catalog #	Description
7326400	Aurum Plasmid Mini Kit , 100 preps, includes plasmid-binding mini columns, 100 capless collection tubes, reagents, protocol overview

Nucleic Acid Sample Preparation

Nucleic Acid Sample Preparation Consumables

www.bio-rad.com/nasampleprep

See Also

Molecular biology
and biotechnology
grade resins:
page 73.

InstaGene™ Matrix

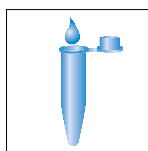
InstaGene matrix is designed for rapid isolation of small amounts of genomic DNA of sufficient purity for PCR in under an hour. The specially formulated 6% w/v Chelex® resin adsorbs cell lysis products that interfere with PCR, leaving genomic DNA template in the supernatant where it is immediately available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

For More Information

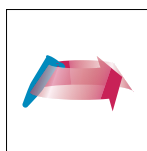
Web: www.bio-rad.com/instagene-matrix

Request or download bulletin: 2074

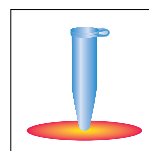
InstaGene Protocol



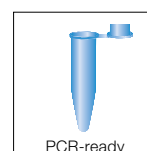
Add bacterial colony to water.



Spin and remove supernatant.



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



Spin; use supernatant for PCR.

Ordering Information

Catalog #	Description
7326030	InstaGene Matrix , 20 ml, sufficient for 100 extractions

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
1421253	Chelex 100 Resin , molecular biology grade, 50 g, sodium, 200–400 dry mesh, 75–150 µm wet bead

Prepacked Spin Columns

Prepacked size exclusion spin columns allow easy cleanup and purification of DNA and proteins from lower MW contaminants. Bio-Spin® and Micro Bio-Spin™ 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.

See Also

Agarose gel system:
page 264.

DNA ladders:
page 274.

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 (732-6250, 732-6251).

Nucleic Acid Sample Preparation

Nucleic Acid Sample Preparation Consumables

www.bio-rad.com/nasampleprep

See Also

Empty columns:
page 113.
Bio-Gel P media:
page 95.
Bio-Spin,
Micro Bio-Spin, and
Mini Bio-Spin
empty columns:
page 113.

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](http://www.bio-rad.com/protein-cleanup)

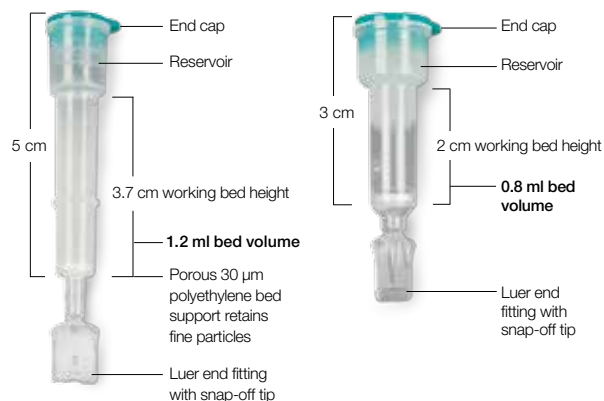
PCR Kleen Spin Columns

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



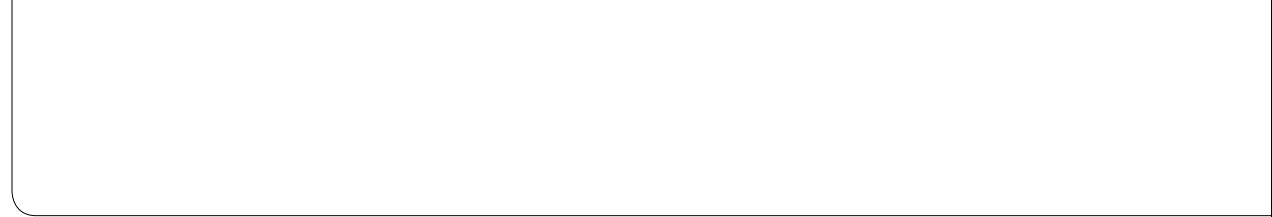
Prepacked Bio-Spin and Micro Bio-Spin Columns

Ordering Information

Catalog #	Description
Micro Bio-Spin Columns with Bio-Gel P-6 in Tris Buffer	
7326221	Micro Bio-Spin 6 Columns, includes 25 columns in Tris buffer, 50 collection tubes
7326222	Micro Bio-Spin 6 Columns, includes 100 columns in Tris buffer, 200 collection tubes
Micro Bio-Spin Columns with Bio-Gel P-30 in Tris Buffer	
7326223	Micro Bio-Spin 30 Columns, includes 25 columns in Tris buffer, 50 collection tubes
7326224	Micro Bio-Spin 30 Columns, includes 100 columns in Tris buffer, 200 collection tubes
7326250	Micro Bio-Spin 30 Columns, includes 25 columns in Tris buffer, 50 collection tubes, RNase-free
7326251	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	
7326200	Micro Bio-Spin 6 Columns, includes 25 columns in SSC buffer, 50 collection tubes
7326201	Micro Bio-Spin 6 Columns, includes 100 columns in SSC buffer, 200 collection tubes
Micro Bio-Spin Columns with Bio-Gel P-30 in SSC Buffer	
7326202	Micro Bio-Spin 30 Columns, includes 25 columns in SSC buffer, 50 collection tubes
7326203	Micro Bio-Spin 30 Columns, includes 100 columns in SSC buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-6 in Tris Buffer	
7326227	Bio-Spin 6 Columns, includes 25 columns in Tris buffer, 50 collection tubes
7326228	Bio-Spin 6 Columns, includes 100 columns in Tris buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-30 in Tris Buffer	
7326231	Bio-Spin 30 Columns, includes 25 columns in Tris buffer, 50 collection tubes
7326232	Bio-Spin 30 Columns, includes 100 columns in Tris buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-6 in SSC Buffer	
7326002	Bio-Spin 6 Columns, includes 25 columns in SSC buffer, 50 collection tubes
Bio-Spin Columns with Bio-Gel P-30 in SSC Buffer	
7326006	Bio-Spin 30 Columns, includes 25 columns in SSC buffer, 50 collection tubes
PCR Kleen Spin Columns	
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Protein Assay Kits

See Also

SmartSpec Plus spectrophotometer: page 33.

Microplate readers: page 340.

Cuvettes: page 35.

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

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	100 µl	100 µl	100 µl	100 µl
Linear range	0.125–1.5 mg/ml	0.125–1.5 mg/ml	0.125–1.5 mg/ml	0.2–1.5 mg/ml
Low-concentration assay				
Sample volume	1 ml	800 µl	200 µl	200 µl
Linear range	1.25–25 µg/ml	1.25–25 µg/ml	5–250 µg/ml	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
5000201	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
5000202	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)
5000203	Quick Start Bradford Protein Assay Kit 3 , includes 1x dye reagent (1 L), bovine γ -globulin standard (5 x 2 mg/ml)
5000204	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

5000205	Quick Start Bradford 1x Dye Reagent, 1 L
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Accessories

5000206	Quick Start Bovine Serum Albumin Standard, 5 x 2 ml vials of 2 mg/ml
5000207	Quick Start Bovine Serum Albumin Standard Set, 2 sets of 7 concentration standards, 0.125–2.0 mg/ml
5000208	Quick Start Bovine γ -Globulin Standard, 5 x 2 ml vials of 2 mg/ml
5000209	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
5000001	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
5000002	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

5000006	Bio-Rad Protein Assay Dye Reagent Concentrate, 450 ml
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Accessories

5000005	Protein Standard I, bovine γ -globulin, reconstituted volume 20 ml
5000007	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
5000111	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
5000112	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

5000113	Protein Assay Reagent A , 250 ml, alkaline copper tartrate solution
5000114	Protein Assay Reagent B , 1 L, dilute Folin reagent
5000115	Protein Assay Reagent S , 5 ml, surfactant solution
5000116	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

5000005	Protein Standard I , bovine γ -globulin, lyophilized (reconstituted volume 20 ml)
5000007	Protein Standard II , bovine serum albumin, lyophilized (reconstituted volume 20 ml)

See Also

Protein sample preparation:
page 2.

Cuvettes:
page 35.

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
5000121	RC DC Protein Assay Kit I , includes RC reagents package, DC protein assay reagents package, bovine γ -globulin standard; sufficient for 450 standard assays
5000122	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	
5000113	Protein Assay Reagent A , 250 ml, alkaline copper tartrate solution
5000114	Protein Assay Reagent B , 1 L, dilute Folin reagent
5000115	Protein Assay Reagent S , 5 ml, surfactant solution
5000116	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
5000120	RC DC Protein Assay Reagents Package , includes RC reagents package and DC protein assay reagents package; sufficient for 450 standard assays
5000119	RC Reagents Package , includes RC reagent I (250 ml) and RC reagent II (250 ml); sufficient for 500 standard assays
5000117	RC Reagent I , 250 ml
5000118	RC Reagent II , 250 ml
Accessories	
5000005	Protein Standard I , bovine γ -globulin, lyophilized (reconstituted volume 20 ml)
5000007	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 $\mu\text{g/ml}$ (additionally in $\text{pmol}/\mu\text{l}$ 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 either using 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

Cuvettes

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

For More Information

Web: www.bio-rad.com/spectrophotometry

Request or download bulletin: 2826

* This product may not be available in all regions. Please check availability with your Bio-Rad Sales Representative.

Spectrophotometer Cuvette Selection Guide

Min. Volume, μ l	Max. Volume, μ l	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
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SmartSpec Plus Spectrophotometer

1702525	SmartSpec Plus Spectrophotometer
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Accessories

1702502	Standard Cuvette, 1–3.5 ml, quartz
1702503	Semimicrovolume Cuvette, 0.5–1.4 ml, quartz
1702504	Microvolume Cuvette, 200–700 μ l, quartz
1702505	Submicrovolume Cuvette, 80–100 μ l, quartz
1702506	SmartSpec Printer Paper, 5 pack
1702507	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 ($\geq 50 \mu\text{l}$) 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
1702510	trUView Cuvettes, pack of 50
1702511	trUView Cuvettes, pack of 100

Standard and Semimicrovolume Cuvettes

Standard 3.5 ml cuvettes are ideal for use with protein assays (page 30). 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	
2239950	Standard Disposable Polystyrene Cuvettes, 3.5 ml, 100
2239955	Semimicrovolume Disposable Polystyrene Cuvettes, 1.5 ml, 100
Quartz Cuvettes	
1702502	Standard Cuvette, 1–3.5 ml, quartz, for use with the SmartSpec Plus spectrophotometer
1702503	Semimicrovolume Cuvette, 0.5–1.4 ml, quartz, for use with the SmartSpec Plus spectrophotometer
1702504	Microvolume Cuvette, 200–700 µl, quartz, for use with the SmartSpec Plus spectrophotometer
1702505	Submicrovolume Cuvette, 80–100 µl, quartz, for use with the SmartSpec Plus spectrophotometer
VersaFluor Disposable Cuvettes and Cuvette Racks	
1702415	Standard Cuvettes, 12.5 x 12.5 mm (outside dimensions), 4-sided, optically clear polystyrene, 3.5 ml, 100
1702416	Microcuvettes, 3.0 x 3.0 mm (outside dimensions), 4-sided, optically clear polystyrene, 150–350 µl, 100
1660485	Cuvette Racks, hold 12 cuvettes each, set of 5

Disposable Polystyrene Cuvettes

2239950 Standard Disposable Polystyrene Cuvettes, 3.5 ml, 100

2239955 Semimicrovolume Disposable Polystyrene Cuvettes, 1.5 ml, 100

Quartz Cuvettes

1702502 Standard Cuvette, 1–3.5 ml, quartz, for use with the SmartSpec Plus spectrophotometer

1702503 Semimicrovolume Cuvette, 0.5–1.4 ml, quartz, for use with the SmartSpec Plus spectrophotometer

1702504 Microvolume Cuvette, 200–700 µl, quartz, for use with the SmartSpec Plus spectrophotometer

1702505 Submicrovolume Cuvette, 80–100 µl, quartz, for use with the SmartSpec Plus spectrophotometer

VersaFluor Disposable Cuvettes and Cuvette Racks

1702415 Standard Cuvettes, 12.5 x 12.5 mm (outside dimensions), 4-sided, optically clear polystyrene, 3.5 ml, 100

1702416 Microcuvettes, 3.0 x 3.0 mm (outside dimensions), 4-sided, optically clear polystyrene, 150–350 µl, 100

1660485 Cuvette Racks, hold 12 cuvettes each, set of 5

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Cell Counting

Automated Cell Counting System

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 5×10^4 – 1×10^7 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



TC20 Automated Cell Counter, Counting Slides, and Trypan Blue

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

Ordering Information

Catalog #	Description
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TC20 Automated Cell Counter

1450102	TC20 Automated Cell Counter , 120–240 V, includes instrument, power supply, USB flash drive, 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue
1450103	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 500 labels, 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue

Kits and Reagents*

1450003	Counting Kit , includes 30 dual-chamber counting slides (60 count), 1.5 ml trypan blue
1450013	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
1450021	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
1450022	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
1450015	Counting Slides , 150 dual-chamber counting slides (300 counts)
1450016	Counting Slides , 300 dual-chamber counting slides (600 counts)
1450017	Counting Slides , 600 dual-chamber counting slides (1,200 counts)
1450018	Counting Slides , 900 dual-chamber counting slides (1,800 counts)
1450019	Counting Slides , 1,200 dual-chamber counting slides (2,400 counts)
1450020	Counting Slides , 2,400 dual-chamber counting slides (4,800 counts)
1450014	System Test Kit , includes verification slide, instructions

Accessories*

1450005	Thermal Label Printer , 120–240 V, includes thermal label printer, USB cable, 1 roll of 500 labels
1450007	Thermal Printer Labels , 1 roll of 500 labels, for thermal label printer

* Compatible with TC20 and TC10 automated cell counters.





Flow Cytometry

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Cell Viability Assays	52
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Cell Sorting

Cell sorting provides a method to sort or isolate a homogenous population of cells from a heterogeneous mixture of cells based on intracellular and/or extracellular properties, typically fluorescence. Expressed fluorescent proteins, such as green fluorescent protein (GFP), or fluorophores conjugated to antibodies bind to markers of interest. This allows a mixed starting population to be sorted to greater than 99% purity. While cell sorting is commonly used in fields such as immunology, cancer biology, and stem cell biology, it is quickly becoming a useful tool in broader research studies from microbiology to neuroscience. Cell sorting can also be used as an upstream tool for proteomic or genomic experiments to achieve more specific results by reducing background noise or false positives.

Instruments

See Also

S3 Biosafety
System Class I:
page 47.

Cell sorting
consumables:
page 48.

Flow cytometry
reagents:
page 51.

Cell counting:
page 40.

New S3e™ Cell Sorter

The S3e cell sorter is the first truly walk-away automated cell sorter available to scientists. The S3e is a compact cell sorter equipped with one or two lasers and up to four fluorescence detectors plus forward and side scatter detection. The cell sorter utilizes established jet-in-air technology in which cells are analyzed directly within the stream before being sorted. Samples can be sorted at high speeds while sensitivity and purity are maintained.

Expertly engineered ProDrop™ technology automates the drop delay calculation and droplet break-off monitoring, thereby simplifying one of the most complex and error-prone aspects of cell sorting. The drop delay is calculated through direct counting of bead events, ensuring extraordinarily high accuracy and precision.

The S3e features the AutoGimbal™ system, a highly sophisticated system combining five picomotor controllers, imaging, and software algorithms to enable a hands-free automated process for nozzle tip and stream to optics alignment. The AutoGimbal system provides the added confidence and reproducibility in the sort setup to achieve the best sort results day to day.

The S3e cell sorter is an easy-to-use benchtop sorter for both flow cores and cell biology laboratories. Affordable without compromising performance, this full-featured cell sorter provides researchers access to cell sorting without the need for a dedicated operator.

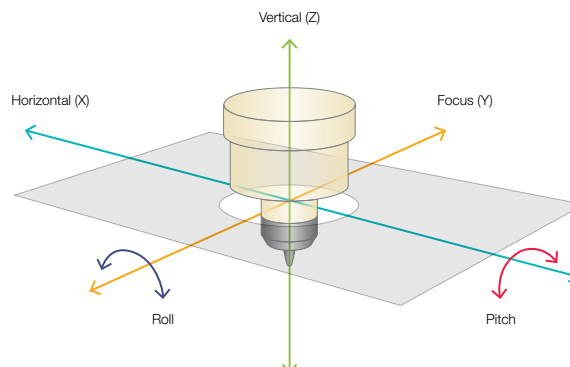


Features include:

- **Simplified instrument setup** — automated drop delay calculation and droplet break-off monitoring enable precise 1–4 color sorting with minimal training
- **Hands-free nozzle tip alignment** — features AutoGimbal system for fully automatic and walk-away setup
- **Compact design** — only 70 x 65 x 65 cm (2.3 x 2.1 x 2.1 ft) in dimension, it includes an onboard fluidics and temperature control system
- **High speed and high purity** — sorts cells fast while maintaining high sensitivity and purity
- **2-way cell sorting** — sorts samples into 2 different defined populations at the same time
- **Intuitive interface** — features user-friendly ProSort™ software for effortless instrument control and sort logic definition

Core capabilities of the AutoGimbal system are:

- High resolution automated alignment system driven by software
- Software controlled using image processing and algorithms
- Precise positioning of the nozzle and stream trajectory are fine-tuned with a 5-axis piezo-driven submicron motion control
- 3 axes (x, y, and z) for optimal positioning of the nozzle stream at the intersection of the lasers and detectors
- 2 axes (roll and pitch) for adjusting the stream trajectory necessary for accurate drop delay determination and stream alignment
- Reproducible and reliable mechanism for full nozzle accessibility



For More Information

Web: www.bio-rad.com/cellsorter

Request or download bulletin: 6614 and #10032007

S3e Cell Sorter System

Features

Performance	Droplet frequency	37–43 kHz
	Sorting type	True jet-in-air for high-performance sorting
	Sorting rate	No hardware limitations for sort rate, limited only by droplet frequency and application
	Sorting purity	>99% pure
	Sensitivity	<125 MESF for FITC and PE
	Temperature control	Sample and collection temperature control from 4–37°C using Peltier solid state system
Lasers/Optics	One-laser system	Primary: 488 nm 100 mW
	Two-laser system	Primary: 488 nm 100 mW Secondary: 561 nm 100 mW
	Detectors	Forward scatter (FSC) with photomultiplier tube (PMT) Side scatter (SSC) with PMT 2 fluorescence detectors with PMT (one laser) 4 fluorescence detectors with PMT (two lasers)
	Filters (488 laser)	Longpass: 495DLP, 560DLP, 540LP Bandpass: 488/6, 525/30
	Filters (488/561 lasers)	Longpass: 495DLP, 560DLP, 593DLP, 655LP Bandpass: 488/6, 525/30, 615/25, 586/25
Fluidics	Nozzle	100 µm fixed
	Pressure	30 psi fixed
	Sheath	Onboard dilution of 8x sheath fluid or direct use of 1x sheath fluid
	Minimum sample loading	200 µl
Sorting	Directions	Two way
	Mode	Single, purity, enrichment
	Collection	Up to 5 x 5 ml sample tubes each direction Up to 5 x 1.5 ml tubes each direction
		Microscope slides 8-well strip each direction
Physical Specifications	Dimensions (W x D x H)	70 x 65 x 65 cm (instrument only)
	Weight	90 kg (instrument only)

See Also

ProLine rainbow beads: page 48.

ProFlow 8x sheath fluid, preservative free: page 49.

S3 fluidic containers, sterile: page 50.

Ordering Information

Catalog #	Description
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S3e Cell Sorter

1451005	S3e Cell Sorter (488 nm) , 488 nm 100 mW laser, includes 2 fluorescence detectors with filters, 2 fluidic containers with connectors, software
1451006	S3e Cell Sorter (488/561 nm) , 488 nm and 561 nm 100 mW lasers, includes 4 fluorescence detectors with filters, 2 fluidic containers with connectors, software
1451078	S3 Biosafety System Class I
1451029	S3e Cell Sorter (488 nm) with S3 Biosafety System Class I
1451030	S3e Cell Sorter (488/561 nm) with S3 Biosafety System Class I

Accessories

1441001	S3 Sheath Cap Assembly , white
1441002	S3 DI Water Cap Assembly , blue
1441003	S3 Waste Cap Assembly , red
1441005	S3 Filter Block A , empty with 2 dichroic filter holders
1441006	S3 Filter Block B , empty with 2 dichroic filter holders
1441007	S3 Individual Filter Holder , black, empty
1441008	Neutral Density Filter , optical density 1.0
1441009	S3 Nozzle Tip , 100 µm
1441010	S3 Nozzle O-Ring with Alignment Disk , pkg of 2
1441011	S3 Collection Adaptor Set
1441012	Hex Driver , 2 mm
1441013	S3 Individual Dichroic Filter Holder , empty
1451076	S3 Power Conditioner , international
1451077	S3 Power Conditioner , U.S.
1451065	S3 Cell Sorter Accessory Kit , includes 100 µm nozzle tip, 2 nozzle O-rings, 2 nozzle alignment disks, 1 ml syringe, 2 neutral density filters (1.0), 2 mm hex driver, spanner wrench
1451086	ProLine Universal Calibration Beads , includes 3 x 5 ml bottles of ready-to-use beads for alignment verification and drop delay determination on the S3e cell sorter
1451082	ProFlow Sort Grade 8x Sheath Fluid , includes 5 x 4 L ready-to-use, sterile preservative-free phosphate buffered saline (PBS) solutions in gamma-irradiated S3 fluidic containers
1451083	ProFlow Sort Grade Water , includes 5 x 4 L sterile, endotoxin-free water in gamma-irradiated S3 fluidic containers
1451084	S3 Fluidic Containers, Sterile , includes 3 x 4 L gamma-irradiated sterile containers for use on the S3e cell sorter
1451085	ProLine Rainbow Beads , includes a 5 ml bottle containing a mixture of beads dyed with 8 different fluorescence intensities for excitation at wavelengths between 365–650 nm

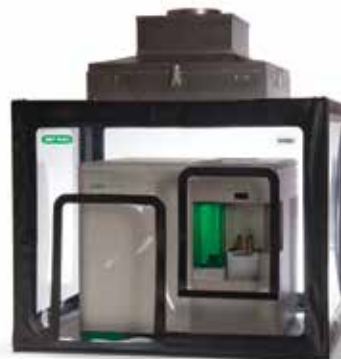
New S3™ Biosafety System Class I

The S3 Biosafety System Class I is an aerosol containment hood custom designed for the S3 or S3e cell sorter, which provides users and the environment protection from aerosols created during the cell sorting process. It is an affordable alternative to traditional large and expensive biosafety hoods commonly offered for cell sorters.

The S3 Biosafety System Class I sits directly on the benchtop and contains the compact S3 or S3e™ cell sorter. Its easy-to-open, magnetically attached vinyl walls provide ready access to all sides of the cell sorter during operation, cleaning and maintenance, or service.

Fully integrated with and monitored by the S3 or S3e cell sorter's ProSort™ software, users have real-time information about HEPA filter life and the temperature of the system inside. Fan speed is determined based on the cell sorter operation mode — sorting or idle. The HEPA filter provides protection at 99.997% for 0.3 µm particles. The system is able to perform a 100% air exchange six to eight times per minute around the S3 or S3e cell sorter.

The system adheres to the biosafety requirements of the International Society for Advancement of Cytometry (ISAC) for aerosol containment.



Product features include:

- **Compact and affordable** — small footprint for an economical alternative to large and expensive traditional biosafety hoods
- **Software controlled** — full integration with ProSort software for fan speed regulation and temperature monitoring in real time
- **Fully accessible** — easily opened vinyl walls are magnetically attached, allowing access to all 4 sides of the cell sorter for cleaning and maintenance
- **Quiet and energy efficient** — generates low vibration and sound pressure levels; specialized fans and low backpressure from the HEPA filter reduce energy consumption

For More Information

Web: www.bio-rad.com/S3BiosafetyMore

Request or download bulletin: 6404 and 6503

Ordering Information

Catalog #	Description
1451005	S3e Cell Sorter (488 nm) , 488 nm 100 mW laser, includes 2 fluorescence detectors with filters, 2 fluidic containers with connectors, software
1451006	S3e Cell Sorter (488/561 nm) , 488 nm and 561 nm 100 mW lasers, includes 4 fluorescence detectors with filters, 2 fluidic containers with connectors, software
1451078	S3 Biosafety System Class I
1451029	S3e Cell Sorter (488 nm) with S3 Biosafety System Class I
1451030	S3e Cell Sorter (488/561 nm) with S3 Biosafety System Class I
1451076	S3 Power Conditioner , international
1451077	S3 Power Conditioner , U.S.

Consumables

New ProLine™ Universal Calibration Beads

ProLine universal calibration beads are designed to verify the alignment performance and determine the drop delay on any S3™ or S3e™ cell sorter with a 488, 488/561, or 488/640 nm laser configuration. Each bottle contains a single population of ready-to-use fluorescent beads for a total of 30 quality control (QC) tests.

Product features include:

- Ready-to-use fluorescent beads do not require dilution
- Alignment and drop delay can be performed with 1 reagent in less than 7 min
- Pass/fail performance result with ProSort™ software
- Trending QC information in ProSort software for tracking the performance of your S3 or S3e cell sorter



For More Information

Web: www.bio-rad.com/prolineuniversal

Request or download bulletin: 6614 and #10041517

See Also

ProFlow 8x sheath fluid, preservative free: page 49.

ProFlow sort grade water: page 50.

S3 fluidic containers, sterile: page 50.

ProLine™ Rainbow Beads

ProLine rainbow beads are designed for instrument performance monitoring on the S3 or S3e cell sorter. Each bottle contains 3.0–3.4 µm beads with eight different fluorescence intensities. Beads can be excited with wavelengths between 365–650 nm.

- Easily check the sensitivity and linearity of your S3 or S3e cell sorter with one set of beads
- Track fluorescence fluctuations with bead lots validated on the S3 or S3e cell sorter to ensure accurate baselines
- Use on other flow cytometry and cell sorter instruments



For More Information

Web: www.bio-rad.com/s3emore

Request or download bulletin: 6614

Ordering Information

Catalog #	Description
1451085	ProLine Rainbow Beads , includes a 5 ml bottle containing a mixture of beads with 8 different fluorescence intensities for excitation at wavelengths between 365–650 nm
1451086	ProLine Universal Calibration Beads , 15 ml (3 x 5 ml)

New ProFlow™ Sort Grade 8x Sheath Fluid

ProFlow sort grade 8x sheath fluid is a ready-to-use, sterile, endotoxin- and preservative-free phosphate buffered saline solution. Each lot is tested for cytotoxicity and particulates and is bottled in gamma-irradiated containers to ensure sterility. Up to 5 weeks of run time is available per case when it is used on the S3™ or S3e™ cell sorter. The S3 or S3e cell sorter employs its internal fluidics system to automatically dilute ProFlow sort grade 8x sheath fluid and creates 32 L of 1x sheath solution from each container, generating 160 L per case.

Product features include:

- **No manual dilution required** — the S3 and S3e cell sorters' unique internal fluidics chamber automatically generates a 1x solution, ensuring accurate dilution and minimizing potential contamination
- **Easy container swapping** — prepackaged, sterile S3 fluidic container bypasses the need to fill a new container during a sort, minimizing the risk of contamination
- **Minimum storage requirements** — one 20 L case creates 160 L of 1x sheath solution, freeing your storage space for other purposes

For More Information

Web: www.bio-rad.com/sheath

Request or download bulletin: 6614 and #10030825



See Also

ProLine calibration beads: page 48.

ProLine rainbow beads: page 48.

ProFlow sort grade water: page 50.

S3 Fluidic containers, sterile: page 50.

Ordering Information

Catalog #	Description
1451082	ProFlow Sort Grade 8x Sheath Fluid, 20 L (5 x 4 L)

See Also

ProLine calibration beads: page 48.
ProLine rainbow beads: page 48.
ProFlow 8x sheath fluid, preservative free: page 49.

ProFlow™ Sort Grade Water

ProFlow sort grade water is a sterile, endotoxin-free solution designed to give the best sort results when combined with ProFlow sort grade 8x sheath fluid on the S3™ or S3e™ cell sorter system. Each lot is prepared by reverse osmosis, passed through fine carbon, deionized through two resin beds, serially filtered twice through 0.1 µm positively charged membranes, and dispensed into gamma-irradiated S3 fluidic containers.

For More Information

Web: www.bio-rad.com/s3emore

Request or download bulletin: 6614



Ordering Information

Catalog #	Description
1451083	ProFlow Sort Grade Water , includes 5 x 4 L sterile, endotoxin-free water in gamma-irradiated S3 fluidic containers

S3™ Fluidic Containers

S3 fluidic containers are specifically designed for use on the S3 cell sorter system. Easily store your solutions in the S3 fluidic containers for quick container swaps during a run. Each 4 L container is gamma irradiated to ensure sterility.

For More Information

Web: www.bio-rad.com/s3emore

Request or download bulletin: 6614



Ordering Information

Catalog #	Description
1451084	S3 Fluidic Containers , 3 x 4 L gamma-irradiated, sterile containers for use on the S3 cell sorter

Flow Cytometry Reagents

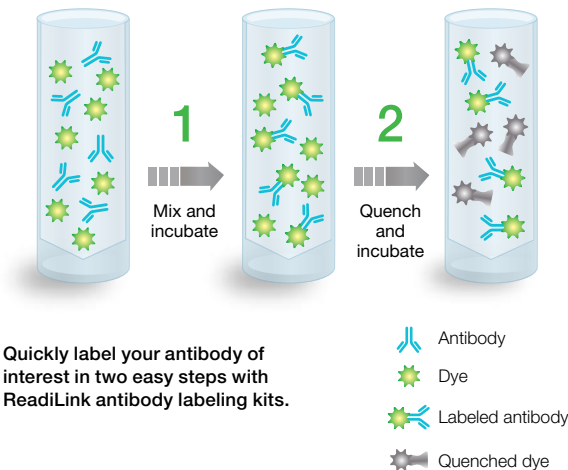
Antibody Labeling Kits

Antibody Labeling Kits

ReadiLink antibody labeling kits offer easy fluorescence conjugations in microscale volumes. Each kit provides all the essential components to perform two 50 µg conjugation reactions of monoclonal/polyclonal antibodies. Available across a broad wavelength spectrum from UV to infrared, the ReadiLink kits can be used to easily conjugate any antibody of interest for use in a multicolor flow cytometry experiment.

- Efficiently labels microscale volumes of antibodies in 2 easy steps
- Forms a stable carboxamide bond with proprietary fluorescent dye
- Eliminates background fluorescence interference from free labeling dye with proprietary quench buffer

For More Information
Web: www.bio-rad.com/readilink1



See Also

Cell sorting consumables:
page 48.
Cell counting:
page 40.

Ordering Information

Catalog #	Description
1351001	ReadiLink 350/440 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351002	ReadiLink 492/516 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351003	ReadiLink 555/570 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351004	ReadiLink 594/610 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351005	ReadiLink 633/655 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351006	ReadiLink 647/674 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351007	ReadiLink 680/701 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351008	ReadiLink 700/713 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351009	ReadiLink 750/780 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351010	ReadiLink 790/811 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351011	ReadiLink 405/454 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351012	ReadiLink 405/508 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351013	ReadiLink 405/537 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies

Cell Viability Assays

New VivaFix™ Cell Viability Assay

Bio-Rad's VivaFix cell viability assays provide a sensitive measurement for determining the viability of mammalian cells by flow cytometry, cell sorting, and microscopy.

Taking advantage of an array of proprietary amine reactive dyes, VivaFix cell viability assays can easily assist researchers distinguish between live and dead cells, providing at least a 100-fold difference in fluorescence intensity between the two populations. The brightness of VivaFix dyes is preserved upon treatment with fixative agents and can be used with biohazardous samples to track cell viability after fixation.



Product features include:

- Optimal discrimination between dead and live cell populations
- Compatible with cell fixation
- 8 different excitation/emission wavelength combinations to fit the most demanding multicolor experiments

For More Information

Web: www.bio-rad.com/vivafix

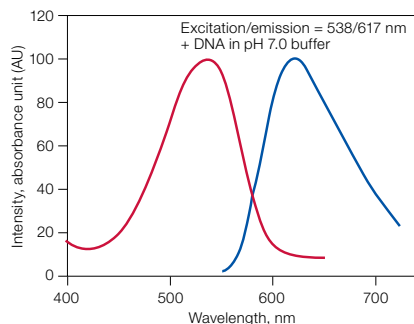
Request or download bulletin: 6559 and #10041645

Ordering Information

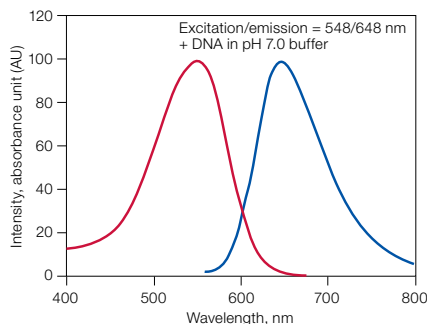
Catalog #	Description
1351111	VivaFix 353/442 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351112	VivaFix 410/450 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351113	VivaFix 408/512 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351114	VivaFix 398/550 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351115	VivaFix 498/521 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351116	VivaFix 547/573 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351117	VivaFix 583/603 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351118	VivaFix 649/660 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays

ReadiDrop™ Cell Viability Assays

Designed for ease of use in cell sorting and flow cytometry applications, ReadiDrop™ cell viability assays remove the traditional manual weighing, pipetting, and dilution steps required with commonly available cell viability dyes. Simply add one or two drops to assess the health of your cells.

**ReadiDrop Propidium Iodide**

- Cell impermeant nucleic acid-binding dye that enhances fluorescence 20- to 30-fold after binding to double stranded DNA/RNA
- Ready-to-use formulation in PBS without preservatives
- Stable at room temperature
- Maximum excitation: 535 nm
- Maximum emission: 617 nm

**ReadiDrop 7-AAD**

- Cell impermeant DNA binding dye with a high affinity for GC base pairs
- Ready-to-use formulation in PBS without preservatives
- Stable at room temperature
- Maximum excitation: 546 nm
- Maximum emission: 647 nm

For More Information

Web: www.bio-rad.com/readidrop1

Ordering Information

Catalog #	Description
1351101	ReadiDrop Propidium Iodide , includes 3 x 3 ml bottles of ready-to-use ultra-pure grade propidium iodide suspended in PBS for dead cell exclusion in cell sorting and flow cytometry applications
1351102	ReadiDrop 7-AAD , includes 3 x 3 ml bottles of ready-to-use 7-aminoactinomycin D (7-AAD) suspended in PBS for dead cell exclusion in cell sorting and flow cytometry applications

Cell Proliferation Assays

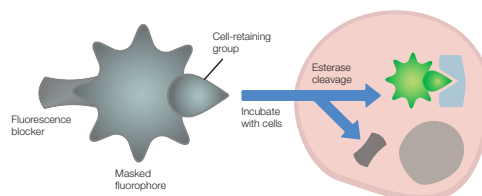
CytoTrack™ Cell Proliferation Assay

CytoTrack cell proliferation assays are designed to efficiently stain live cells for excellent resolution of each cell division generation. Using a proprietary chemistry, the CytoTrack dye reacts with intracellular proteins and is effectively retained in the cell without efflux, allowing resolution up to ten cell divisions to be detected. As cell division occurs, the dye is successively halved and the different generations can be determined based on the decrease in fluorescence intensities.

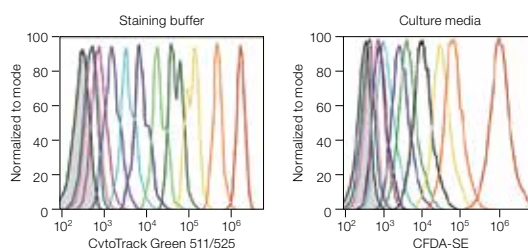
- Save time by using the dyes directly with your cell culture media
- Fix and permeabilize your cells for intracellular analysis using standard formaldehyde-containing fixatives and saponin-based permeabilization buffers
- Easily combine CytoTrack dyes with fluorescent proteins or antibody-labeled fluorophores for multicolor cell analysis

For More Information

Web: www.bio-rad.com/cytotrack



Consisting of three components, CytoTrack dyes efficiently label live cells for visualizing up to ten cell divisions.



Resolve up to 10 cell divisions in staining buffer or culture media.

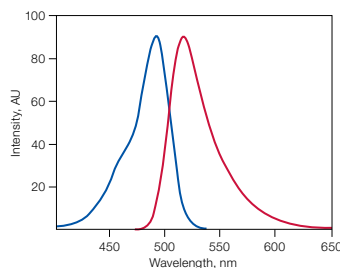
Ordering Information

Catalog #	Description
1351202	CytoTrack Blue 403/454 , includes 4 vials blue dye and 1 vial DMSO for 200 cell proliferation tests
1351203	CytoTrack Green 511/525 , includes 4 vials green dye and 1 vial DMSO for 200 cell proliferation tests
1351204	CytoTrack Yellow 542/556 , includes 4 vials yellow dye and 1 vial DMSO for 200 cell proliferation tests
1351205	CytoTrack Red 628/660 , includes 4 vials red dye and 1 vial DMSO for 200 cell proliferation tests

CFDA-SE Cell Proliferation Assay

CFDA-SE cell proliferation assay provides carboxyfluorescein diacetate, succinimidyl ester (CFDA-SE) in a convenient and easy-to-use format. CFDA-SE is a cell-permeable dye that fluoresces after the acetate groups are cleaved by intracellular esterases, creating carboxyfluorescein diacetate succinimidyl ester (CFSE). As the succinimidyl ester group reacts with primary amines of intracellular proteins, the CFSE is retained in the cell and is successively halved during cell divisions.

- Visualize up to 8 cell divisions
- Minimize contamination and reduce dilution steps with smaller vial size



CFDA-SE excitation/emission is 492/517 nm in 0.1 M NaOH. Excitation wavelength (—); emission wavelength (—). AU, absorbance unit.

For More Information

Web: www.bio-rad.com/cytotrack1

Ordering Information

Catalog #	Description
1351201	CFDA-SE Cell Proliferation Assay Kit , includes 5 x 100 µg 5(6)-carboxyfluorescein diacetate succinimidyl ester, CFSE

Subject Index

Antibody Labeling Kits, 51
CFDA-SE Cell Proliferation Assay, 54
CytoTrack™ Cell Proliferation Assay, 54
ProFlow™ Sort Grade 8x Sheath Fluid, 49
ProFlow™ Sort Grade Water, 50
ProLine™ Rainbow Beads, 48
ProLine™ Universal Calibration Beads, 48
ReadiDrop™ Cell Viability Assays, 53
S3e™ Cell Sorter, 44
S3™ Biosafety System Class I, 47
S3™ Fluidic Containers, 50
VivaFix™ Cell Viability Assay, 52





Cell Imaging

Cell Imaging

Bio-Rad's suite of tools for fluorescence microscopy and cell imaging includes the ZOE fluorescent cell imager and nuclear dyes.

See Also

PureBlu Hoechst 33342 nuclear staining dye: page 59.
PureBlu DAPI nuclear staining dye: page 60.
ReadiLink antibody labeling kits: page 51.
VivaFix cell viability assays: page 52.
Cell proliferation assay: page 54.

New ZOE™ Fluorescent Cell Imager

The ZOE fluorescent cell imager is a complete imaging system that is suitable for routine cell culture and imaging applications. It eliminates the complexities of cell imaging by combining the ease of use of a personal tablet with the power of an inverted microscope. An intuitive Android-based touch-screen interface is used to control brightfield, three fluorescence channels, and the integrated digital camera.

As a fully integrated system with long-life light-emitting diodes (LEDs), the ZOE cell imager is a robust imaging device ready for intensive daily use. There are no time-consuming setup and hardware adjustments to perform (optical and illumination alignment, changing filter sets or objective lenses) or parts with a limited life span that could result in costly maintenance (replacing mercury arc lamps).

The ZOE cell imager uses high-quality hard-coated filter sets that provide higher light transmission and long life. Its 20x plan achromatic objective lens is mounted in a proprietary manner, resulting in a wide field of view (0.70 mm²) that is ~180% greater than that of a traditionally mounted 20x objective lens. When zoomed out it is approximately equivalent to that of a 4x objective. When needed, use the pinch-to-zoom gesture to magnify up to 20x by digital zoom while retaining resolution (1 µm).

Product features include:

- **Simplified cell imaging** — the intuitive touch-screen interface allows users to view cells, capture images, and create multichannel merges
- **Flexible system** — brightfield and three fluorescence channels enable use for routine cell culture applications as well as more sophisticated imaging applications
- **Fluorescence at your bench** — an integrated light shield permits fluorescence imaging in ambient light



ZOE Fluorescent Cell Imager

- **Robust construction** — fully integrated system with long-life LEDs is ready for intensive daily use
- **LED light sources** — thousands of hours of illumination that are instantly ready after power on
- **Large field of view** — the motorized stage and large field of view allow you to see more of your sample, faster
- **Small footprint** — compact size accommodates crowded laboratory benches

For More Information

Web: www.bio-rad.com/ZOE

Request or download bulletin: 6585

Ordering Information

Catalog #	Description
1450031	ZOE Fluorescent Cell Imager, 120–240 V, includes instrument, power supply, USB flash drive

Kits and Reagents

Bio-Rad offers a variety of kits and reagents for use with the ZOE fluorescent cell imager.

Ordering Information

Catalog # Description

Nuclear Staining Dyes

1351303 **PureBlu DAPI Nuclear Staining Dye**, pkg of 1, includes 5 x 50 µg vials of DAPI powder
 1351304 **PureBlu Hoechst 33342 Nuclear Staining Dye**, pkg of 1, includes 5 x 56 µg vials of Hoechst 33342 powder

Antibody Labeling Kits

1351001 **ReadiLink 350/440 Antibody Labeling Kit**, includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
 1351002 **ReadiLink 492/516 Antibody Labeling Kit**, includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
 1351003 **ReadiLink 555/570 Antibody Labeling Kit**, includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
 1351004 **ReadiLink 594/610 Antibody Labeling Kit**, includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies

Fixable Viability Dyes

1351111 **VivaFix 353/442 Cell Viability Assay**, pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
 1351115 **VivaFix 498/521 Cell Viability Assay**, pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
 1351116 **VivaFix 547/573 Cell Viability Assay**, pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
 1351117 **VivaFix 583/603 Cell Viability Assay**, pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays

Cell Proliferation Assay

1351201 **CFDA-SE**, pkg of 1, 5 x 100 µg vials

New PureBlu™ Hoechst 33342 Nuclear Staining Dye

PureBlu Hoechst 33342 nuclear staining dye is a highly pure formulation of Hoechst 33342 fluorescent dye. It is available in a user-friendly format that allows easy preparation of the working solution without any weighing step and with a single dilution after resuspension. PureBlu Hoechst 33342 dye permeates cell membranes and binds double-stranded DNA, which enables identification of nuclei within cells. It has a maximum excitation wavelength of 350 nm in the ultraviolet range and can be optimally detected in the blue channel with a maximum emission wavelength of 461 nm.

Product features include:

- Easy to reconstitute without any weighing step
- Only 1-step dilution after resuspension
- Compatible with multicolor experiments



For More Information

Web: www.bio-rad.com/PureBluHoechst33342
 Request or download bulletin: #10043283 and 6607

See Also

ReadiLink antibody labeling kits: page 51.

VivaFix cell viability assays: page 52.

Cell proliferation assay: page 54.

Ordering Information

Catalog # Description

1351304 **PureBlu Hoechst 33342 Nuclear Staining Dye**, pkg of 1, includes 5 x 56 µg vials of Hoechst 33342 powder

New PureBlu™ DAPI Nuclear Staining Dye

PureBlu DAPI nuclear staining dye is a highly pure formulation of 4',6-diamidino-2-phenylindole dihydrochloride (DAPI) fluorescent dye. It is available in a user-friendly format that allows easy preparation of the working solution without any weighing step and with a single dilution after resuspension. PureBlu DAPI dye permeates cell membranes and binds double-stranded DNA, which enables identification of nuclei within cells. It has a maximum excitation wavelength of 359 nm in the ultraviolet range and can be optimally detected in the blue channel with a maximum emission wavelength of 461 nm.



Product features include:

- Easy to reconstitute without any weighing step
- Only 1-step dilution after resuspension
- Compatible with multicolor experiments

For More Information

Web: www.bio-rad.com/PureBluDAPI

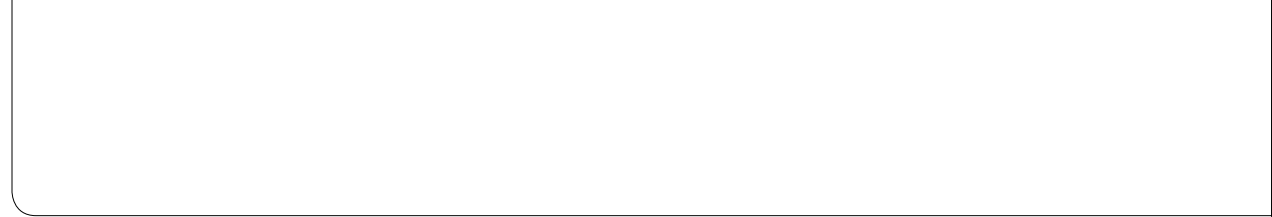
Request or download bulletin: #10043282 and 6607

Ordering Information

Catalog #	Description
1351303	PureBlu DAPI Nuclear Staining Dye, pkg of 1, includes 5 x 50 µg vials of DAPI powder

Subject Index

Kits and Reagents for Cell Imaging, 59
PureBlu™ DAPI Nuclear Staining Dye, 60
PureBlu™ Hoechst 33342 Nuclear Staining Dye, 59
ZOE™ Fluorescent Cell Imager, 58





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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 resins 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 resin, column, or instrument. We offer products for each phase of purification and manufacture resins for any scale from nanograms to kilograms.

Bio-Rad offers a wide range of lab and process chromatography resins for ion exchange, hydroxyapatite, affinity, size exclusion, and hydrophobic interaction chromatography as well as chromatography standards. For convenient sample preparation products, see page 2. Bio-Rad's process chromatography resins are used worldwide to manufacture registered biotherapeutics and diagnostics. All chromatography resins 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.

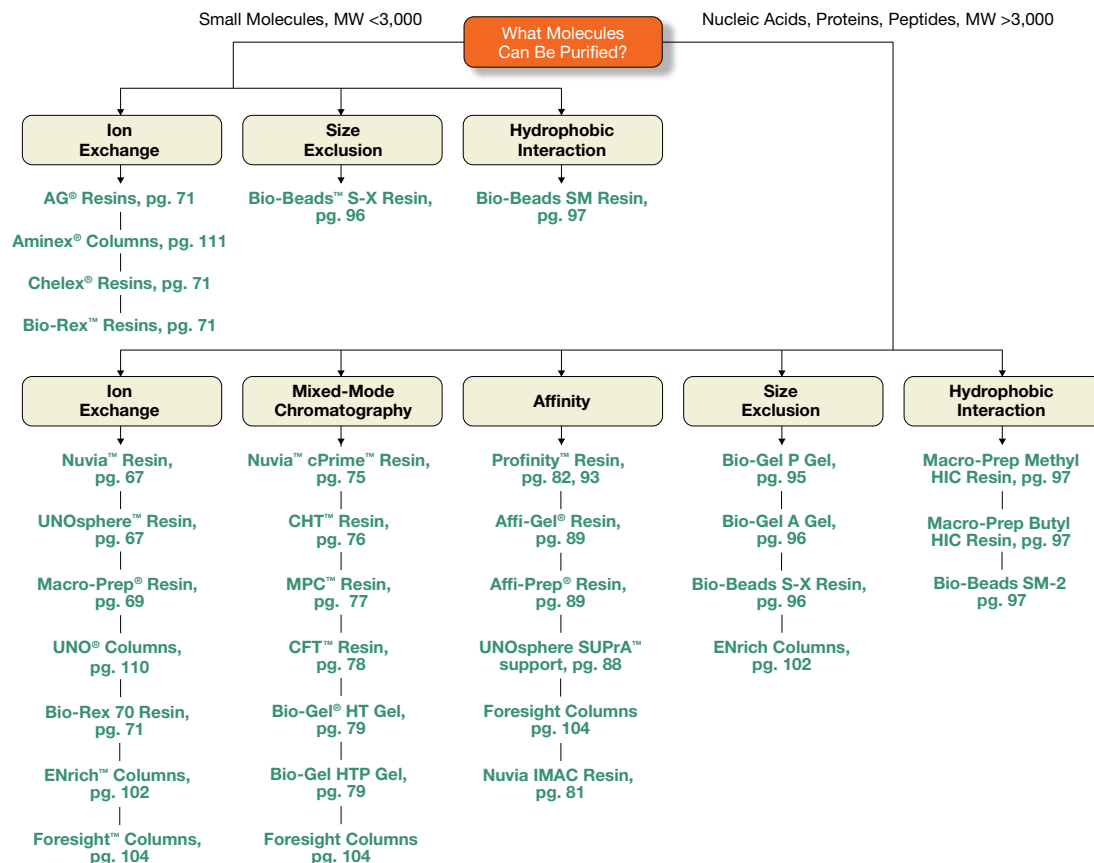
Development, Application, and Validation Support

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 resins 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 Resins/Media

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

Chromatography Resin Selection Guide

Chromatography Resin Selection Guide						
Resin	Packaging Format*	Suitability**			Application	Page
		Analytical Scale	Pilot/Preparative Scale	Process Scale		
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	71
AG MP-1M	B, GC	++++	++	+	Strong exchanger. Macroporous, equivalent to AG 1 for MW >1,000,000; gravity or low-pressure use	71
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	71
UNO® Q	MPC	++++			Strong exchanger. High-resolution biomolecule separation at high flow rates; pH stability 2–12	67
Macro-Prep® High Q	B, C	+++	++++	+++	Strong exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	69
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	69
Macro-Prep DEAE	B, C	+++	++++	+++	Weak exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	69
UNOsphere™ Q	B, C, F	++++	++++	++++	Strong exchanger. High-productivity, high-capacity biomolecule separation; pH stability 1–14	67
Aminex®	HPLC	++++			High-pressure separation of carbohydrates, sugars, and small organic molecules; delivers industry-standard performance (U.S. Pharmacopeia)	111
Nuvia™ Q	B, F	++++	++++	++++	Strong exchanger. Similar to UNOsphere Q but surface modification allows extremely high-capacity biomolecule separation; pH stability 1–14	67
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	71
AG MP-50	B, GC	++++	++	+	Strong exchanger. Macroporous equivalent to AG 50W for MW >1,000,000; gravity or low-pressure use	71
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	71
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	71
UNO® S	MPC	++++			Strong exchanger. High-resolution biomolecule separation at high flow rates; pH stability 2–12	67
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	69
Macro-Prep High S	B, C	+++	++++	+++	Strong exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	69
Macro-Prep CM	B	+++	++++	+++	Weak exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	69
UNOsphere S	B, C, F	++++	++++	++++	Strong exchanger. High-capacity biomolecule separation; pH stability 1–14	67
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	67
Nuvia S	B, C, F	++++	++++	++++	Strong exchanger. Similar to UNOsphere S but surface modification allows extremely high-capacity biomolecule separation; pH stability 1–14	65
Nuvia HR-S	B, C, F	++++	++++	++++	Strong exchanger. Similar to UNOsphere Rapid S but smaller particle size for high resolution	65

* 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 Resin Selection Guide (cont.)

Resin	Packaging Format	Analytical Scale	Suitability**		Application	Page
			Pilot/ Preparative Scale	Process Scale		
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	71
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	71
Bio-Rex MSZ 501	B	++++	++	++	Mixed bed, consists of equivalent amounts of Bio-Rex MSZ 1 and Bio-Rex MSZ 50 resin. Monosized ion exchange; desalting of water and nonelectrolytes. Ideal for large-scale industrial applications	71
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	95
Bio-Beads™ S-X	B	++++	++++	++	Fractionation of low MW organic polymers and other hydrophobic substances in nonpolar solvents from 400–14,000 D	96
Affinity						
UNOsphere SUPra™	B, C, F	++++	++++	++++	Antibody purification; Fc-fusion purification from large volumes of feed/cell culture; development and commercial-scale mAb purification process applications	88
Affi-Gel® protein A	B, C, GC	++++	++++		IgG purification from ascites, serum, and culture fluid; low-pressure resin	89
Affi-Prep® protein A	B, C	++++	++++	++	IgG purification from ascites, serum, and culture fluid; pressure-stable resin	89
Affi-Gel® Blue	B, C, SC	++++	++++		Albumin removal and enzyme purification; Cibacron Blue F3GA dye covalently attached; purification of proteins with dinucleotide fold	90
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	90
CM Affi-Gel Blue	B	++++	++++		Albumin and protease removal for IgG purification; Cibacron Blue F3GA dye covalently attached to CM Bio-Gel A	91
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	92
Nuvia™ IMAC	B, C	++++	++++	++	Purification of recombinant histidine-tagged proteins; can be charged with other transition metals	81
Profinity™ IMAC	B, C	++++	++++	++	Histidine-tagged protein purification	82
Profinity GST	C	++++	++++	++	GST-tagged protein purification	83
Profinity eXact™	B, C, SC	++++	++++	++	One-step affinity tag purification and on-column cleavage	83
Affi-Prep polymyxin	B	++++	++++	++++	Removal of endotoxins; pressure-stable resin capable of sanitization procedures with NaOH	92
Affi-Gel boronate	B	++++	++		Affinity for low MW molecules containing <i>cis</i> hydroxyl (<i>cis</i> -diol) groups; separation of AMP from cyclic AMP	91
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	93
Affi-Gel 10	B	++++	++++		Affinity coupling; immobilization of ligands with –NH ₂ groups, coupling of proteins with pI 6.5–11; low-pressure resin	93
Affi-Gel 15	B	++++	++++		Affinity coupling; immobilization of ligands with –NH ₂ groups, coupling of proteins with pI <6.5; low-pressure resin	93
Affi-Gel Hz	B	++++	++++		Affinity coupling; immobilization of IgG molecules via their Fc region	94
Affi-Gel 102	B	++++	++++		Affinity coupling of ligands with –COOH groups via EDAC coupling chemistry	94
Mixed-Mode Resins						
Nuvia™ cPrime™	B, C, F	++++	++++	++++	Recombinant protein purification. Uses hydrophobic and weak cation exchange modes	75
CHT™ Type I	B, C, MPC, F	++++	++++	++++	Antibody purification (higher capacity than Type II); virus purification/removal; DNA purification/removal; aggregate and endotoxin removal	76
CHT Type II	B, C, F	++++	++++	++++	Antibody purification; removal of albumin from feedstream; vaccine/VLP purification	76
MPC™ Type I	B, F	++++	++++	++++	Antibody purification; virus purification/removal; DNA purification/removal; aggregate and endotoxin removal; exhibits greater stability during pH excursions inherent in buffer exchanges	77
CFT™ Type II	B	++++	++++	++++	Similar properties to CHT but exhibits greater stability in the lower pH range (5.5)	78
Bio-Gel HT	B	++++	+++		Purification of proteins, nucleic acids, and other biomolecules; crystalline hydroxyapatite not as mechanically stable as CHT (ceramic hydroxyapatite)	79
Bio-Gel HTP	B	++++	+++		Similar to Bio-Gel HT but in powder form	79
DNA grade Bio-Gel HTP	B	++++	+++		Similar to Bio-Gel HTP with smaller particle size; selectivity for dsDNA; separation of ss- and dsDNA	79
Hydrophobic Interaction						
Macro-Prep methyl	B	++++	++++	++	Separation of proteins based on relative hydrophobicity; pH stability 1–10	97
Macro-Prep t-butyl	B	++++	++++	++	Separation of proteins based on relative hydrophobicity; pH stability 1–10	97

* 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 Resins

UNOsphere™ and Nuvia™ Ion Exchange Resins

Bio-Rad's ion exchange resins 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 resins 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 Resins

UNOsphere Q and S resins are strong anion and cation exchange resins, respectively, and may be used at any stage of the purification process. The Rapid S resin has 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 resin — 2724 and 2729; UNOsphere S resin — 2669 and 2678

Nuvia Ion Exchange Resins

Nuvia ion exchange resins are a family of next-generation ion exchange resins built on an industry-proven proprietary base matrix technology. Nuvia resins provide very high capture and exceptional flow properties designed to meet current and future process needs. Nuvia Q and S resins are flexible alternatives that may be used as capture and/or polishing solutions. Nuvia HR-S is a high-resolution cation exchanger designed for intermediate and final polish applications.

- Use less resin to purify a given amount of product
- Reduce cycle time and increase productivity by operating at higher flow rates
- Reduce cost 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, 6128, and 6448

See Also

Chromatography systems: page 121.

Prepacked columns: page 101.

AEX and CEX standards: page 99.

Sample preparation products: page 2.

See Also

Resin sampler packs: page 98.

Bio-Scale Mini cartridges: page 105.

Specifications

	UNOsphere Q	UNOsphere S	UNOsphere Rapid S	Nuvia Q	Nuvia S	Nuvia HR-S
Type of ion exchanger	Strong anion	Strong cation	Strong cation	Strong anion	Strong cation	Strong cation
Functional group	$-\text{N}^+(\text{CH}_3)_3$	$-\text{SO}_3^-$	SO_3^-	$-\text{N}(\text{CH}_3)_3^+$	$-\text{SO}_3^-$	$-\text{SO}_3^-$
Total ionic capacity	75–163 µeq/ml	219–315 µeq/ml	110–170 µeq/ml	100–170 µeq/ml	90–150 µeq/ml	100–180 µeq/ml
Median particle size	120 ± 15 µm	80 ± 10 µm	100 ± 10 µm	85 ± 15 µm	85 ± 15 µm	50 ± 10 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	≥70 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	50–200 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	2–14 short term 4–13 long term
Sanitization	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	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.

Chromatography Resins

Ion Exchange Resin

www.bio-rad.com/ionexchange

Ordering Information

Catalog #	Description	Comments
1560311	Nuvia S Media , 25 ml	Ultra-high capacity strong cation process media
1560313	Nuvia S Media , 100 ml	
156-0315	Nuvia S Media , 500 ml	
156-0317	Nuvia S Media , 10 L	
156-0511	Nuvia HR-S Media , 25 ml	High resolution strong cation process media
156-0513	Nuvia HR-S Media , 100 ml	
156-0515	Nuvia HR-S Media , 500 ml	
156-0517	Nuvia HR-S Media , 10 L	
1560411	Nuvia Q Media , 25 ml	Ultra-high capacity strong anion process media
1560413	Nuvia Q Media , 100 ml	
156-0415	Nuvia Q Media , 500 ml	
156-0417	Nuvia Q Media , 10 L	
1560101	UNOsphere Q Media , 25 ml	High-capacity strong anion media
1560103	UNOsphere Q Media , 100 ml	
156-0105	UNOsphere Q Media , 500 ml	
156-0107	UNOsphere Q Media , 10 L	
1560111	UNOsphere S Media , 25 ml	High-capacity strong cation media
1560113	UNOsphere S Media , 100 ml	
156-0115	UNOsphere S Media , 500 ml	
156-0117	UNOsphere S Media , 10 L	
1560211	UNOsphere Rapid S Media , 25 ml	High-capacity strong cation and fast equilibration media
1560213	UNOsphere Rapid S Media , 100 ml	

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	7324420	7324421	7324422	7324423
UNOsphere Q Media	—	7324100	7324102	7324104
UNOsphere S Media	—	7324110	7324112	7324114
UNOsphere Rapid S Media	—	7324400	7324401	7324402

Adaptor Fittings for Bio-Scale Mini Cartridges

7320111	Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to an FPLC system
7320112	Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to an HPLC or NGC system
7320113	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
7885010	Luer to 10-32 Adaptor Fittings Kit , includes female slip luer to female 10-32 fitting to connect male end of luer column to NGC system

* Also available in Foresight prepacked plates and columns, see page 104 for ordering information.

Macro-Prep® Ion Exchange Resin

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

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 High Q, DEAE, High S, and CM Resins

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

For More Information

Web: www.bio-rad.com/macroprep

Request or download bulletins: Macro-Prep DEAE resin — 1942; High S and High Q resins — 5643 and 5644



Macro-Prep Resins

Bio-Scale™ Mini Macro-Prep Cartridges

See Also

Bio-Scale Mini, UNOsphere Q and S, Macro-Prep High Q and S, affinity, P-6 cartridges: page 105.

Macro-Prep 25 Q and S Resins

Macro-Prep 25 Q strong anion exchange resin and Macro-Prep 25 S strong cation exchange resin offer high-resolution separations at high flow rates with medium pressures. Both resins possess the same rigid, macroporous, and hydrophilic properties of 50 µm Macro-Prep High Q and High S resins, 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 resin	Strong anion	Weak anion	Strong cation	Weak cation	Strong anion	Strong cation
Functional ligand	-N ⁺ (CH ₃) ₃	-N ⁺ (C ₂ H 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.

Chromatography Resins

Ion Exchange Resins

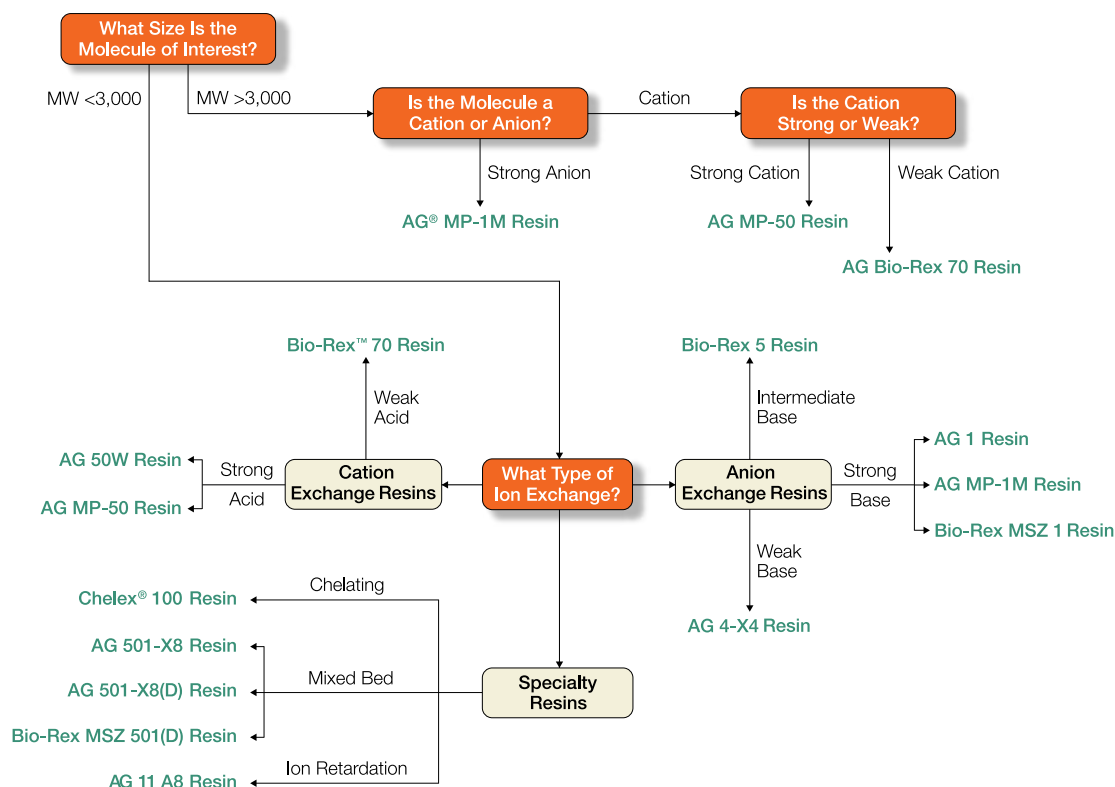
www.bio-rad.com/ionexchange

Ordering Information

Catalog #	Description	Comments	
Macro-Prep High Q Resin/Media			
1580040	Macro-Prep High Q Media, 25 ml	High-capacity strong anion exchange media; very high flow rates and resolution	
1560040	Macro-Prep High Q Media, 100 ml		
1560041	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 Resin/Media			
1580020	Macro-Prep DEAE Media, 25 ml	High-capacity weak anion exchange media; very high flow rates and resolution	
1560020	Macro-Prep DEAE Media, 100 ml		
1560021	Macro-Prep DEAE Media, 500 ml		
156-0022	Macro-Prep DEAE Media, 5 L		
156-0023	Macro-Prep DEAE Media, 10 L		
Catalog #	Description	Comments	
Macro-Prep High S Resin/Media			
1580030	Macro-Prep High S Media, 25 ml	High-capacity strong cation exchange media; very high flow rates and resolution	
1560030	Macro-Prep High S Media, 100 ml		
1560031	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 Resin/Media			
1580070	Macro-Prep CM Media, 25 ml	High-capacity weak cation exchange media; high flow rates and resolution	
1560070	Macro-Prep CM Media, 100 ml		
1560071	Macro-Prep CM Media, 500 ml		
156-0073	Macro-Prep CM Media, 10 L		
Macro-Prep 25 Q Resin/Media			
1530021	Macro-Prep 25 Q Media, 50 ml	Strong anion exchange media; 25 µm bead that offers higher resolution	
1530022	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 Resin/Media			
1530031	Macro-Prep 25 S Media, 50 ml	Strong cation exchange media; 25 µm bead that offers higher resolution	
1530032	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	7324120	7324122	7324124
Macro-Prep High S Media	7324130	7324132	7324134
Macro-Prep DEAE Media	7324140	7324142	7324144
Adaptor Fittings for Bio-Scale Mini Cartridges			
7320111	Luer to M6 Adaptor Fittings Kit, includes luer to M6 fittings to connect 1 cartridge to an FPLC system		
7320112	Luer to 10-32 Adaptor Fittings Kit, includes luer to 10-32 fittings to connect 1 cartridge to an HPLC, or NGC system		
7320113	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		
7885010	Luer to 10-32 Adaptor Fittings Kit, includes female slip luer to female 10-32 to connect male end of luer column to NGC 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

Chromatography Resins

Analytical Grade Ion Exchange Resins

www.bio-rad.com/agresins

Ordering Information

Catalog #	Description	Ionic Form	Dry Mesh Size	Wet Bead Size, μm	Nominal Shipping % Water
AG Resins					
1401231	AG 1-X2 Resin, 500 g	Chloride	50–100	180–500	70–78
1401241	AG 1-X2 Resin, 500 g	Chloride	100–200	106–250	70–78
1401251	AG 1-X2 Resin, 500 g	Chloride	200–400	75–180	70–78
1401253	AG 1-X2 Resin, 500 g	Acetate	200–400	75–180	70–78
1401331	AG 1-X4 Resin, 500 g	Chloride	50–100	180–425	59–65
1401341	AG 1-X4 Resin, 500 g	Chloride	100–200	106–250	59–65
1401351	AG 1-X4 Resin, 500 g	Chloride	200–400	63–150	59–65
1401421	AG 1-X8 Resin, 500 g	Chloride	20–50	300–1,180	39–45
1401431	AG 1-X8 Resin, 500 g	Chloride	50–100	180–425	39–45
1401441*	AG 1-X8 Resin, 500 g	Chloride	100–200	106–180	39–45
1401451*	AG 1-X8 Resin, 500 g	Chloride	200–400	45–106	39–45
1401422	AG 1-X8 Resin, 500 g	Hydroxide	20–50	300–1,180	39–45
1401443	AG 1-X8 Resin, 500 g	Acetate	100–200	106–180	39–45
1401453	AG 1-X8 Resin, 500 g	Acetate	200–400	45–106	39–45
1401444	AG 1-X8 Resin, 500 g	Formate	100–200	106–180	39–45
1401454	AG 1-X8 Resin, 500 g	Formate	200–400	45–106	39–45
1421231	AG 50W-X2 Resin, 500 g	Hydrogen	50–100	300–1,180	75–83
1421241*	AG 50W-X2 Resin, 500 g	Hydrogen	100–200	106–300	75–83
1421251	AG 50W-X2 Resin, 500 g	Hydrogen	200–400	75–180	75–83
1421331	AG 50W-X4 Resin, 500 g	Hydrogen	50–100	180–425	64–72
1421341	AG 50W-X4 Resin, 500 g	Hydrogen	100–200	106–250	64–72
1421351*	AG 50W-X4 Resin, 500 g	Hydrogen	200–400	63–150	64–72
1421421	AG 50W-X8 Resin, 500 g	Hydrogen	20–50	300–1,180	50–56
1421431	AG 50W-X8 Resin, 500 g	Hydrogen	50–100	180–425	50–56
1421441***	AG 50W-X8 Resin, 500 g	Hydrogen	100–200	106–250	50–56
1421451***	AG 50W-X8 Resin, 500 g	Hydrogen	200–400	63–150	50–56
1421641	AG 50W-X12 Resin, 500 g	Hydrogen	100–200	106–250	42–48
1421651	AG 50W-X12 Resin, 500 g	Hydrogen	200–400	53–106	42–48
1411831	AG MP-1M Resin, 500 g	Chloride	50–100	150–300	56–64
1411841	AG MP-1M Resin, 500 g	Chloride	100–200	75–150	56–64
1411851	AG MP-1M Resin, 500 g	Chloride	200–400	38–75	56–64
1430841	AG MP-50 Resin, 500 g	Hydrogen	100–200	75–150	46–52
1404341*	AG 4-X4 Resin, 500 g	Free base	100–200	75–150	—
1426424****	AG 501-X8 Resin, 500 g	H ⁺ + OH ⁻	20–50	300–1,180	43–55
1426425**	AG 501-X8(D) Resin, 500 g	H ⁺ + OH ⁻	20–50	300–1,180	43–55
1427834*	AG 11 A8 Resin, 500 g	Self-adsorbed	50–100	180–425	—
Bio-Rex Resins					
1407841	Bio-Rex 5 Resin, 500 g	Chloride	100–200	75–150	50–58
1407851	Bio-Rex 5 Resin, 500 g	Chloride	200–400	45–75	50–58
1425822	Bio-Rex 70 Resin, 500 g	Sodium	20–50	300–1,180	65–74
1425832*	Bio-Rex 70 Resin, 500 g	Sodium	50–100	150–300	65–74
1425842	Bio-Rex 70 Resin, 500 g	Sodium	100–200	75–150	65–74
1425852*	Bio-Rex 70 Resin, 500 g	Sodium	200–400	45–75	65–74
1427425*	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

1422822	Chelex 100 Resin, 500 g	Sodium	50–100	300–1,180	68–76
1422832*	Chelex 100 Resin, 500 g	Sodium	100–200	150–300	68–76
1422842**	Chelex 100 Resin, 500 g	Sodium	200–400	75–150	68–76
1422825	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

1401231	AG 1-X2 Resin, chloride, 500 g
1401255	AG 1-X2 Resin, acetate, 200–400 mesh, 10 kg
1401342	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				
7316211	Poly-Prep Columns, AG 1-X8 resin, 100–200 mesh, 50	106–180	Chloride	Separation of low molecular weight inorganic anions
7316212	Poly-Prep Columns, AG 1-X8 resin, 200–400 mesh, 50	45–106	Chloride	For high-resolution general purpose separations
7316221	Poly-Prep Columns, AG 1-X8 resin, 200–400 mesh, 50	45–106	Formate	Separation of low molecular weight biological compounds such as carboxylic acids
7316213	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
7316214	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

Chromatography Resins

Analytical Grade Ion Exchange Resins

www.bio-rad.com/agresins

Ordering Information

Catalog #	Description	Dry Mesh Ionic Form	Wet Bead Size	Size, μm	Application
Prepacked Poly-Prep Ion Exchange Columns					
1436424	AG 501-X8 Resin , molecular biology grade, 100 g	$\text{H}^+ + \text{OH}^-$	20–50	300–1,180	Deionization
1436425	AG 501-X8(D) Resin , molecular biology grade, 100 g	$\text{H}^+ + \text{OH}^-$	20–50	300–1,180	~1,000 MW limit
1421253	Chelex 100 Resin , molecular biology grade, 50 g	Sodium	200–400	75–150	DNA extraction for PCR sample preparation
Biotechnology Grade Resins/Media					
1431255	AG 1-X2 Resin , biotechnology grade, 100 g	Hydroxide	200–400	75–180	Separation of small peptides, nucleotides, and large metal complexes
1431345	AG 1-X4 Resin , biotechnology grade, 100 g	Hydroxide	100–200	63–150	Separation of organic acids, nucleotides, phosphoinositides, and other anions
1432445	AG 1-X8 Resin , biotechnology grade, 100 g	Hydroxide	100–200	106–180	Separation of inorganic and organic anions with MW <1,000
1432446	AG 1-X8 Resin , biotechnology grade, 100 g	Hydroxide	200–400	45–106	
1435241	AG 50W-X2 Resin , biotechnology grade, 100 g	Hydrogen	100–200	106–300	Separation of peptides, nucleotides, and cations
1435341	AG 50W-X4 Resin , biotechnology grade, 100 g	Hydrogen	200–400	75–150	Separation of amino acids, nucleotides, and cations
1435441	AG 50W-X8 Resin , biotechnology grade, 100 g	Hydrogen	100–200	106–250	Separation of amino acids and cations
1435451	AG 50W-X8 Resin , biotechnology grade, 100 g	Hydrogen	200–400	63–150	
1437834	AG 11 A8 Resin , biotechnology grade, 100 g	Self- adsorbed	50–100	180–425	Removal of ionic compounds
1437424	AG 501-X8 Resin , biotechnology grade, 100 g	$\text{H}^+ + \text{OH}^-$	20–50	300–1,180	Deionization
1437425	AG 501-X8(D) Resin , biotechnology grade, 100 g	$\text{H}^+ + \text{OH}^-$	20–50	300–1,180	
1432832	Chelex 100 Resin , biotechnology grade, 100 g	Sodium	100–200	150–300	PCR sample preparation
1435832	Bio-Rex 70 Resin , biotechnology grade, 100 g	Sodium	50–100	150–300	Separation of cationic proteins and amines
1435852	Bio-Rex 70 Resin , biotechnology grade, 100 g	Sodium	200–400	45–75	
1528920	Bio-Beads SM-2 , 25 g	—	—	—	Detergent removal
1523920	Bio-Beads SM-2 , 100 g	—	—	—	Detergent removal

Technical and Reactor Grade Resins

Bio-Rad offers reactor grade Bio-Rex® RG 501-X8 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	$\text{H}^+ + \text{OH}^-$	20–50	1,000
4449999	Bio-Rex RG 501-X8 Resin , 500 g	$\text{H}^+ + \text{OH}^-$	20–50	1,000

* 1 ft³ corresponds to approximately 20 kg. Larger volumes and special packaging are available on request.

Mixed-Mode Chromatography Resins/Media

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

Nuvia™ cPrime™ Mixed-Mode Resin

Nuvia cPrime hydrophobic cation exchange resin is a member of Bio-Rad's family of mixed-mode purification products. This resin is designed for process-scale purification of a wide variety of therapeutic proteins. Nuvia cPrime's unique selectivity allows method developers to use hydrophobic and cation exchange interaction modes to achieve effective purification. Importantly, the resin 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.

Nuvia cPrime delivers value by providing:

- 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, 6242, and 6418

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* hlgG	≥40 mg/ml
Dynamic binding capacity* lactoferrin	>60 mg/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 hlgG.

** 20 x 20 cm packed bed (1.17 compression factor).

*** Stored at room temperature in 20% ethanol under accelerated conditions.

See Also

Resin sampler pack: page 98.

Bio-Scale Mini CHT cartridges: page 105.

Bio-Scale CHT Type I columns: page 109.

Ordering Information

Catalog #	Description
156-3401	Nuvia cPrime Media, 25 ml
156-3402	Nuvia cPrime Media, 100 ml
156-3403	Nuvia cPrime Media, 500 ml
156-3404	Nuvia cPrime Media, 1 L
156-3405	Nuvia cPrime Media, 5 L
156-3406	Nuvia cPrime Media, 10 L
7324722	Foresight Nuvia cPrime Column, 1 ml
7324742	Foresight Nuvia cPrime Column, 5 ml
7324705	Foresight Nuvia cPrime Plates, 20 µl*
7324807	Foresight Nuvia cPrime RoboColumn Unit, 200 µl**
7324808	Foresight Nuvia cPrime RoboColumn Unit, 600 µl**

* Package size: 2 x 96-well plates.

** Package size: 1 row of 8 columns.

Chromatography Resins

Mixed-Mode Resins

www.bio-rad.com/mixedmode

Hydroxyapatite ($\text{Ca}_5(\text{PO}_4)_3\text{OH}$)₂ and fluoroapatite $\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$ are forms of calcium phosphate that offer unique selectivities and often separate biomolecules that appear homogeneous when other chromatographic and electrophoretic techniques are used. Hydroxyapatite and fluoroapatite chromatography can be used at any stage from initial capture to final polishing.

CHT™ Ceramic Hydroxyapatite

CHT ceramic hydroxyapatite ($\text{Ca}_5(\text{PO}_4)_3\text{OH}$)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 400°C, and Type II, sintered at 700°C 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)	0.63 g/ml	0.63 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, 5853, 6086, and 6549

Ordering Information

Description	Type I	Type II
CHT Ceramic Hydroxyapatite, 20 µm		
20 µm particle size, 10 g	1582000	1582200
20 µm particle size, 100 g	1570020	1572000
20 µm particle size, 1 kg (1.6 L)	157-0021	157-2100
CHT Ceramic Hydroxyapatite, 40 µm		
40 µm particle size, 10 g	1584000	1584200
40 µm particle size, 100 g	1570040	1574000
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	1588000	1588200
80 µm particle size, 100 g	1570080	1578000
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 RoboColumn Units		
Foresight CHT Plate, 40 µm, 20 µl*	7324716	7324718
Foresight CHT Column, 40 µm, 1 ml	7324735	7324736
Foresight CHT Column, 40 µm, 5 ml	7324755	7324756
Foresight CHT RoboColumn Unit, 40 µm, 200 µl**	7324822	7324825
Foresight CHT RoboColumn Unit, 40 µm, 600 µl**	7324823	7324826
Description	1 x 5 ml	5 x 5 ml
CHT Prepacked Bio-Scale Mini Cartridges		
CHT Type I Ceramic Hydroxyapatite	7324322	7324324
CHT Type II Ceramic Hydroxyapatite	7324332	7324334

* Package size: 2 x 96-well plates.

** Package size: 1 row of 8 columns.

Ordering Information

Catalog #	Description
7324407	Bio-Scale Mini Apatite Purification Kit , CHT Type II cartridge, CFT Type II cartridge, 1 x 5 ml each
7324408	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.

MPC™ Ceramic Hydroxyfluoroapatite

MPC ceramic hydroxyfluoroapatite $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_{1.5}(\text{F})_{0.5}$ is a complementary addition to our line of ceramic apatite mixed-mode chromatography resins. MPC is second-generation CHT Type I, 40 μm . MPC is a composite of hydroxyapatite and fluoroapatite, which confers greater pH stability for the resins to provide superior process economics to the biopharmaceutical scientist. MPC has the unique separation properties and unmatched selectivity and resolution of CHT.

Specifications

Functional groups	Ca^{2+} , PO_4 , OH, F
Observed dynamic binding capacity lysozyme (Lys)	≥ 25 mg Lys/g MPC
Nominal pore diameter	600–800 Å
Maximum backpressure	100 bar (1,500 psi)
Nominal mean particle size	40 ± 4 μm
Tap-settled density* (g/ml tap settled bed)	0.72 g/ml

* Under ideal conditions.

Characteristics

Observed dynamic binding capacity IgG	25–50 mg IgG/ml MPC*
Typical linear flow rate range	50–1,000 cm/hr
pH stability	6.5–14 pH
Base stability	At least 1 year in 0.1 N NaOH
Regeneration	0.4–0.5 M sodium phosphate, pH 7–7.5, is generally sufficient. If higher concentrations are needed, use potassium phosphate
Autoclavability (bulk)	121°C, 20 min in phosphate buffer, pH 7
Sanitization	1–2 N NaOH
Recommended column storage	0.1 N NaOH

* 40 μm particles, 300 cm/hr, 5 mM sodium phosphate, 25 mM NaCl, pH 6.5.

For More Information

Web: www.bio-rad.com/MPC

Request or download bulletins: 6432 and 6086

Ordering Information

Description	Type I
MPC Ceramic Hydroxyfluoroapatite, 40 μm	
40 μm particle size, 10 g	1580200
40 μm particle size, 100 g	1570200
40 μm particle size, 1 kg (1.6 L)	157-0201
40 μm particle size, 5 kg (7.9 L)	157-0205
MPC Foresight Plates, Columns, and RoboColumn Units	
Foresight MPC Type I Plate , 20 μg *	7324785
Foresight MPC Type I Column , 40 μm , 1 ml	7324737
Foresight MPC Type I Column , 40 μm , 5 ml	7324757
Foresight MPC Type I RoboColumn Unit , 40 μm , 200 μl **	7324828
Foresight MPC Type I RoboColumn Unit , 40 μm , 600 μl **	7324829

* Package size: 2 x 96-well plates.

** Package size: 1 row of 8 columns.

CFT™ Ceramic Fluoroapatite

CFT ceramic fluoroapatite ($\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$) is a rigid spherical macroporous resin 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 temperatures to produce a physically and chemically stable resin.

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 resin.

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 resins
- 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+} , PO_4^{3-} , F^-
Particle sizes	$40 \pm 4 \mu\text{m}$
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 (121°C, 20 min)	Yes
Packing density (g/ml packed bed)	0.86 g/ml
Dynamic binding capacity lysozyme (Lys)	14–21.5 mg Lys/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
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CFT Ceramic Fluoroapatite, 20 μm

1585200	40 μm particle size, 10 g
1575000	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)

Description	1 x 5 ml	5 x 5 ml
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CFT Prepacked Bio-Scale Mini Cartridges

CFT Type II Ceramic Fluoroapatite	7324405	7324406
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Catalog #	Description
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Bio-Scale Mini Cartridge Kits

7324407	Bio-Scale Mini Apatite Purification Kit , CHT Type II cartridge, CFT Type II cartridge, 1 x 5 ml each
7324408	Bio-Scale Mini mAb Purification Kit , UNOsphere SUPRA affinity cartridge, UNOsphere Q cartridge, CHT Type I cartridge, 1 x 5 ml each

Bio-Gel® Hydroxyapatite HT and HTP Resins

Hydroxyapatite ($\text{Ca}_5(\text{PO}_4)_3\text{OH}$) is a form of calcium phosphate used in the chromatographic separation of biomolecules. Bio-Gel crystalline hydroxyapatite resin 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 a pH above 7 during the autoclaving cycle.

- **Bio-Gel HT resin** — 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 resin 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 resin. When hydrated, it should be stored similarly to Bio-Gel HT resin; the flow rate range is similar to Bio-Gel HT resin
- **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

See Also

CHT ceramic hydroxyapatite: page 76.
Bio-Scale Mini CHT cartridges: page 105.
Bio-Scale CHT Type I columns: page 109.

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
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Bio-Gel Hydroxyapatite

1300150	Bio-Gel HT Hydroxyapatite, hydrated, 250 ml
1300151	Bio-Gel HT Hydroxyapatite, hydrated, 500 ml
1300420	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
1300520	Bio-Gel HTP Hydroxyapatite, DNA grade, 100 g

Accessories

7376201	Econo-Column Open-Ended Jacketed Chromatography Column, 1 x 30 cm, includes 2 flow adaptors for DNA hydroxyapatite chromatography, 25 ml
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Recombinant-Tagged Affinity Purification

New Bio-Scale™ Mini Nuvia™ IMAC Columns

Bio-Scale Mini Nuvia IMAC cartridges are 5 ml Bio-Scale Mini cartridges filled with Nuvia Ni-charged IMAC resin. They are used for the purification of recombinant histidine (His)-tagged proteins by immobilized metal affinity chromatography (IMAC).

IMAC is a powerful purification technique that relies on the affinity that the histidine tag has for immobilized transition metals. Nuvia IMAC resins, based on Nuvia beads, contain nitrilotriacetic acid (NTA) 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+} . Due to its superior mass transfer characteristics, Nuvia IMAC offers high capacity at high flow rates. It can be used under either nondenaturing or denaturing conditions.

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 with aqueous buffers most commonly used for protein separation. Convenient, disposable, and ready to use, these cartridges are designed for use with a peristaltic pump or the BioLogic™, NGC™, or other chromatography systems. For simple step elution, the cartridges can be used with a luer syringe. Fittings are available for connection to HPLC- and FPLC-type systems.



Product Features:

- Superior quality, reproducible separations
- High capacity, even at high flow rates
- Stable at pH 2–14
- Simple luer fittings for easy connection to any system
- Chemically compatible polypropylene parts
- Reusable/disposable format
- Excellent single-step purity by affinity chromatography
- Quick, efficient separation of biomolecules
- Contaminant removal
- Robust base matrix

For More Information

Web: www.bio-rad.com/nuviaIMAC

Ordering Information

Catalog #	Description
7800811	Bio-Scale Mini Nuvia IMAC cartridges, 5 ml
7800812	Bio-Scale Mini Nuvia IMAC cartridges, 5 x 5 ml

New Nuvia™ IMAC Resin

Nuvia IMAC resin is an ultra high capacity, next-generation affinity chromatography resin. Nuvia IMAC resin delivers high binding capacity over a range of pH and flow rates, providing wide experimental design space for many applications. Immobilized metal affinity chromatography (IMAC) is a powerful purification technique that relies on the affinity that the histidine tag has for immobilized transition metals. Nuvia IMAC resins, based on Nuvia beads, contain nitrilotriacetic acid (NTA) 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+} . Due to superior mass transfer characteristics, Nuvia IMAC resin offers high capacity at high flow rates. It can be used under either nondenaturing or denaturing conditions. Nuvia IMAC resin is available in 25, 100, and 500 ml bottles.

Nuvia IMAC resin delivers value and flexibility by providing users:

- Superior quality, reproducible separations
- High capacity, even at high flow rates
- Stability at pH 2–14
- Biomolecule purification in a variety of workflows
- Excellent single-step purity by affinity chromatography
- Quick, efficient separation of biomolecules
- Contaminant removal
- Robust base matrix

For More Information

Web: www.bio-rad.com/nuviaIMACresin

Ordering Information

Catalog #	Description
7800800	Nuvia IMAC Resin , 25 ml
7800801	Nuvia IMAC Resin , 100 ml
7800802	Nuvia IMAC Resin , 500 ml

Chromatography Resins

Recombinant-Tagged Affinity Purification

www.bio-rad.com/affinityresin

Profinity™ IMAC Cartridges and Resins

See Also

Affinity resin
selection guide:
page 66.

Bio-Scale Mini
cartridges:
page 105.

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 resins 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

For More Information

Web: www.bio-rad.com/profinityIMAC



Profinity IMAC Resin



Bio-Scale™ Mini Profinity™ IMAC Cartridges

Ordering Information

Catalog #	Description
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Ready-to-Use Affinity Resins/Media

1560121	Profinity IMAC Uncharged Resin, 10 ml
1560123	Profinity IMAC Uncharged Resin, 50 ml
1560125	Profinity IMAC Uncharged Resin, 500 ml
1560127	Profinity IMAC Uncharged Resin, 1 L
1560131	Profinity IMAC Ni-Charged Resin, 10 ml
1560133	Profinity IMAC Ni-Charged Resin, 25 ml
1560135	Profinity IMAC Ni-Charged Resin, 100 ml
1560137	Profinity IMAC Ni-Charged Resin, 500 ml

Description	5 x 1 ml	1 x 5 ml	5 x 5 ml
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Prepacked Bio-Scale Mini Cartridges

Profinity IMAC Ni-Charged Resin	7324610	7324612	7324614
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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
7324620	Bio-Scale Mini Profinity GST Cartridges , 5 x 1 ml
7324622	Bio-Scale Mini Profinity GST Cartridge , 1 x 5 ml
7324624	Bio-Scale Mini Profinity GST Cartridges , 5 x 5 ml
6200240	GST Buffer Kit , includes GST lysis, wash, and elution buffers
1300425	Bio-Gel HTP Hydroxyapatite , powder, 5 kg
6200223	Profinia GST Buffer Kit , includes lysis, wash, and elution buffers, cleaning and storage solutions, glutathione reagent; sufficient for 10 applications
6200243	GST Purification Kit , 1 ml, includes GST purification buffer kit and 2 x 1 ml GST cartridges
6200244	GST Purification Kit , 5 ml, includes 2 GST purification buffer kits and 1 x 5 ml GST cartridge
6200226	Profinia GST Purification Kit , 1 ml, includes Profinia GST buffer kit, 2 x 1 ml GST and 2 x 10 ml desalting cartridges
6200236	Profinia GST Purification Kit , 5 ml, includes 2 Profinia GST buffer kits, 1 x 5 ml GST and 1 x 50 ml desalting cartridge
6200230	Profinia GST Starter Kit , includes Profinia GST buffer kit, 1 x 1 ml GST and 1 x 10 ml desalting cartridge, <i>E. coli</i> lysate, glutathione reagent

Profinity eXact™ Cartridges and Resins

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 resin 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 Resin 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

Chromatography Resins

Recombinant-Tagged Affinity Purification

www.bio-rad.com/affinity

See Also

Bio-Scale Mini
cartridges:
page 105.

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

Resin 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 μ m
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
1563004	Profinity eXact Monoclonal Antibody , 100 μ l, 1 mg/ml
1563005	Profinity eXact Purification Resin* , 10 ml
1563007	Profinity eXact Mini Spin Columns , includes 10 spin columns, ten 2 ml capped tubes, and ten 2 ml capless tubes
7324646	Bio-Scale Mini Profinity eXact Cartridges , 2 x 1 ml
7324647	Bio-Scale Mini Profinity eXact Cartridges , 4 x 1 ml
7324648	Bio-Scale Mini Profinity eXact Cartridge , 1 x 5 ml
1563000	Profinity eXact Cloning and Expression Starter Kit , includes 25 μ l of 20 ng/ μ l RIC-ready pPAL vector, 100 μ l of 100 ng/ μ l supercoiled pPAL vector, chemi-competent cells, SOC growth media, 20 reactions
1563008	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)
1563006	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.

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



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.

Ordering Information

Catalog #	Description
1563001	Profinity eXact pPAL RIC-Ready Expression Vector Kit , includes 25 µl of 20 ng/µl vector, 20 reactions
1563002	Profinity eXact pPAL Supercoiled Expression Vector Kit , includes 100 µl of 100 ng/µl vector, 20 reactions
1563003	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
1563004	Profinity eXact Monoclonal Antibody , 100 µl, 1 mg/ml
1563005	Profinity eXact Purification Resin* , 10 ml

* Larger volumes are available on request.

Ordering Information

Catalog #	Description
1563007	Profinity eXact Mini Spin Columns , includes 10 spin columns, ten 2 ml capped tubes, and ten 2 ml capless tubes
7324646	Bio-Scale Mini Profinity eXact Cartridges , 2 x 1 ml
7324647	Bio-Scale Mini Profinity eXact Cartridges , 4 x 1 ml
7324648	Bio-Scale Mini Profinity eXact Cartridge , 1 x 5 ml
1563000	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
1563008	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)
1563006	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

Profina™ 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

Kits

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

Profina purification, buffer, and starter kits are designed specifically for use on the Profina 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 Profina system. While designed specifically to work with the Profina system, these reagents also have general applicability within all stages of an affinity purification workflow, from sample preparation to protein detection.



His and GST
Purification *E. coli*
Control Lysate

Glutathione

Histidine and GST Antibodies

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 Profina 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% Na₂S₂O₃.

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

6200239 **Native IMAC Buffer Kit**, includes native IMAC lysis, wash, and elution buffers
 6200240 **GST Buffer Kit**, includes GST lysis, wash, and elution buffers
 6200224 **Desalting and Cartridge Cleaning Buffer Kit**, includes desalting buffer, cleaning buffers, and cartridge storage buffer

Affinity Purification Kits

6200241 **Native IMAC Purification Kit**, 1 ml, includes IMAC purification buffer kit and 2 x 1 ml IMAC cartridges
 6200242 **Native IMAC Purification Kit**, 5 ml, includes 2 IMAC purification buffer kits and 1 x 5 ml IMAC cartridge
 6200243 **GST Purification Kit**, 1 ml, includes GST purification buffer kit and 2 x 1 ml GST cartridges
 6200244 **GST Purification Kit**, 5 ml, includes 2 GST purification buffer kits and 1 x 5 ml GST cartridge

Profinia Buffer Kits

6200221 **Profinia Native IMAC Buffer Kit**, includes lysis, wash, and elution buffers, cleaning and storage solutions; sufficient for 10 applications
 6200223 **Profinia GST Buffer Kit**, includes lysis, wash, and elution buffers, cleaning and storage solutions, glutathione reagent; sufficient for 10 applications

Profinia Purification Kits

6200225 **Profinia IMAC Purification Kit**, 1 ml, includes Profinia native IMAC buffer kit, 2 x 1 ml IMAC and 2 x 10 ml desalting cartridges
 6200235 **Profinia IMAC Purification Kit**, 5 ml, includes 2 Profinia native IMAC buffer kits, 1 x 5 ml IMAC and 1 x 50 ml desalting cartridge
 6200226 **Profinia GST Purification Kit**, 1 ml, includes Profinia GST buffer kit, 2 x 1 ml GST and 2 x 10 ml desalting cartridges
 6200236 **Profinia GST Purification Kit**, 5 ml, includes 2 Profinia GST buffer kits, 1 x 5 ml GST and 1 x 50 ml desalting cartridge
 6200228 **Profinia Desalting Purification Kit**, 10 ml, includes desalting and cartridge cleaning buffer kit, 2 x 10 ml desalting cartridges
 6200238 **Profinia Desalting Purification Kit**, 50 ml, includes 2 desalting and cartridge cleaning buffer kits, 1 x 50 ml desalting cartridge

Profinia Purification Kits

6200229 **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
 6200230 **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

7324610 **Bio-Scale Mini Profinity IMAC Cartridges**, 5 x 1 ml
 7324612 **Bio-Scale Mini Profinity IMAC Cartridge**, 1 x 5 ml
 7324614 **Bio-Scale Mini Profinity IMAC Cartridges**, 5 x 5 ml
 7324620 **Bio-Scale Mini Profinity GST Cartridges**, 5 x 1 ml
 7324622 **Bio-Scale Mini Profinity GST Cartridge**, 1 x 5 ml

continues

Ordering Information

Catalog #	Description
Affinity Buffer Kits	
6200239	Native IMAC Buffer Kit , includes native IMAC lysis, wash, and elution buffers
6200240	GST Buffer Kit , includes GST lysis, wash, and elution buffers
6200224	Desalting and Cartridge Cleaning Buffer Kit , includes desalting buffer, cleaning buffers, and cartridge storage buffer
Affinity Purification Kits	
6200205	2x Native IMAC Lysis Buffer , 125 ml
6200206	2x Native IMAC Wash Buffer 1 , 125 ml
6200207	2x Native IMAC Wash Buffer 2 , 100 ml
6200208	2x Native IMAC Elution Buffer , 100 ml
6200213	2x GST Lysis Buffer , 100 ml
6200215	2x GST Elution Buffer , 100 ml
6200216	5x Desalting Buffer , 200 ml
6200217	2x Cleaning Solution 1 , 125 ml
6200218	4x Cleaning Solution 2 , 125 ml
6200219	2x Storage Solution , 200 ml

Affinity Buffer Kits**Affinity Purification Kits**

Affinity Purification

See Also

Bio-Scale Mini cartridges:
page 105.

UNOsphere SUPra™ Protein A Resin

Developed for monoclonal antibody capture chromatography, UNOsphere SUPra resin 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 resin platform, UNOsphere SUPra resin offers 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	Working pH range	3–11
Particle size range	53–61 µm	Clean-in-place (CIP) solutions	6 M guanidine hydrochloride 10 mM hydrochloric acid 0.1 M sodium hydroxide 1 M acetic acid/20% ethanol
Ligand	Recombinant protein A	Recommended mobile phase velocity range	100–600 cm/hr
Coupling chemistry	Epoxy	Temperature stability	2–40°C
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)	Delivery conditions	50% slurry in 20% ethanol
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)	Storage conditions	2–8°C

* 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 Resin/Media				
1560250	UNOsphere SUPrA rProtein A Media, 5 ml			
1560218	UNOsphere SUPrA rProtein A Media, 25 ml			
1560219	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		7324200	7324201	7324202

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

Chromatography on Affi-Gel and Affi-Prep protein A resins yield highly purified immunoglobulins (IgG), selectively remove IgG prior to analysis of other IgG classes, or adsorb 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 IgG₁ as well as other subclasses with MAPS optimized buffer

In addition, Affi-Prep resins 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 resins and MAPS II buffer, you can purify up to 10 mg of IgG₁/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 IgG₁ than does immobilized protein G resin.

For More Information

Web: www.bio-rad.com/affigelproteina

Capacities of Protein A Resins

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.

Ordering Information

Catalog #	Description			
CHT Ceramic Hydroxyapatite, 20 µm				
1560006	Affi-Prep Protein A Media, 5 ml			
1560005	Affi-Prep Protein A Media, 25 ml			
1536153	Affi-Gel Protein A Media, 5 ml			
1536154	Affi-Gel Protein A Media, 50 ml			
1536159	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			
1536161	Protein A MAPS II Binding Buffer, makes 5 L			
Prepacked Econo-Pac Columns				
7322022	Econo-Pac Protein A Columns, prefilled with Affi-Gel protein A media, 5			
7322020	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		7324600		7324602

Affinity Resins/Media

Affi-Gel® Blue Resin

Affi-Gel Blue resin 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 resin 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 resin is available in bottle and cartridge form.

For More Information

Web: www.bio-rad.com/affigelblue

Ordering Information

Catalog #	Description
1537301	Affi-Gel Blue Media , 100 ml, 50–100 mesh
1537302	Affi-Gel Blue Media , 100 ml, 100–200 mesh
7324642	Bio-Scale Mini Affi-Gel Blue Cartridge , 1 x 5 ml
7324644	Bio-Scale Mini Affi-Gel Blue Cartridges , 5 x 5 ml

DEAE Affi-Gel® Blue Resin

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

- Single-step IgG purification from serum; the eluted IgG contains a small amount of transferrin (samples are diluted approximately fivefold)
- 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		
1537307	DEAE Affi-Gel Blue Media , 100 ml		
7324632	Bio-Scale Mini DEAE Affi-Gel Blue Cartridge , 1 x 5 ml		
7324634	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		7324632	7324634
Affi-Gel Blue Media		7324642	7324644

CM Affi-Gel® Blue Resin

CM Affi-Gel Blue resin contains Cibacron Blue F3GA dye covalently coupled to CM Bio-Gel® A resin.

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 resin 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
1537304	CM Affi-Gel Blue Media, 100 ml

Affi-Gel® Boronate Resin

Affi-Gel boronate-derivatized polyacrylamide resin 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
1536103	Affi-Gel Boronate Media, 5 g
153-6104	Affi-Gel Boronate Media, 50 g

Affi-Prep® Polymyxin Resin

Affi-Prep polymyxin resin consists of 2–4 mg of USP-grade polymyxin per ml of the macroporous polymeric Affi-Prep support. Affi-Prep polymyxin resin 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 resin 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)

For More Information

Web: www.bio-rad.com/affigelpolymyxin



Affi-Prep Polymyxin Resin

Ordering Information

Catalog #	Description
1560010	Affi-Prep Polymyxin Media, 25 ml

Affi-Gel® Heparin Resin

Affi-Gel heparin resin 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 resin include:

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

For More Information

Web: www.bio-rad.com/affigelheparin



Affi-Gel Heparin Resin

Ordering Information

Catalog #	Description
1536173	Affi-Gel Heparin Media, 40 ml

Activated Affinity Resins/Media

Profinity™ Epoxide Resin

Profinity epoxide resin 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 resin, which is then used for the purification of proteins, carbohydrates, or DNA.

Profinity epoxide resin 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
1560200	Profinity Epoxide Media , 5 g
1560201	Profinity Epoxide Media , 25 g

Affi-Gel® 10 and Affi-Gel 15 Resins

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

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

For More Information

Web: www.bio-rad.com/affigel10and15

Request or download bulletin: 1085

Ordering Information

Catalog #	Description
1536099	Affi-Gel 10 Media , 25 ml
1536046	Affi-Gel 10 Media , 4 x 25 ml
153-1000	Affi-Gel 10 Media , 1 L
1536051	Affi-Gel 15 Media , 25 ml
1536052	Affi-Gel 15 Media , 4 x 25 ml
1536098	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 Resin

Affi-Gel Hz hydrazide activated resin couples 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 resins. Affi-Gel Hz resin 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
1536047	Affi-Gel Hz Hydrazide Media , 25 ml
1536060	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
1536054	Affi-Gel Hz 10x Coupling Buffer Concentrate , 500 ml

See Also

Affinity resin selection guide: page 66.

Carbodiimide Activated Resin

Affi-Gel® 102 resin 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 resin offers flexible alternative chemistries and economy.

Affi-Gel 102 amino-terminal cross-linked agarose resins 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
1532401	Affi-Gel 102 Media , 50 ml
1530990	EDAC , 5 g

Size Exclusion Chromatography

Bio-Gel® P Resin

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

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

For More Information

Web: www.bio-rad.com/biodelp
Request or download bulletin: 2068



Bio-Gel P Resin



Bio-Scale™ Mini Bio-Gel Cartridges

Bio-Gel P Polyacrylamide Resin Selection Guide

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

See Also

Sample preparation products: page 2.

Gel filtration chromatography standards: page 99.

Bio-Spin and Micro Bio-Spin prepacked columns: page 107.

Empty Econo-Pac columns: page 114.

ENrich SEC columns: page 103.

Ordering Information

Catalog #	Description	Comments
1504114	Bio-Gel P-2 Media , fine, 100 g	Rapid carbohydrate, peptide, and protein desalting
1504115	Bio-Gel P-2 Media , fine, 500 g	
1504118	Bio-Gel P-2 Media , extra fine, 100 g	Carbohydrate and peptide separations, protein desalting
1504120	Bio-Gel P-4 Media , medium, 100 g	
1504124	Bio-Gel P-4 Media , fine, 100 g	Purification of proteins and polypeptides
1504128	Bio-Gel P-4 Media , extra fine, 100 g	
1504130	Bio-Gel P-6 Media , medium, 100 g	Rapid carbohydrate, peptide, and protein desalting; also available in prepacked columns and cartridges
1504134	Bio-Gel P-6 Media , fine, 100 g	
1504138	Bio-Gel P-6 Media , extra fine, 100 g	Purification of proteins and polypeptides
1500738	Bio-Gel P-6DG Media , 100 g	
150-0739	Bio-Gel P-6DG Media , 1 kg	Rapid carbohydrate, peptide, and protein desalting; also available in prepacked columns and cartridges
1504140	Bio-Gel P-10 Media , medium, 100 g	
1504144	Bio-Gel P-10 Media , fine, 100 g	Purification of proteins and polypeptides
1504150	Bio-Gel P-30 Media , medium, 100 g	
1504154	Bio-Gel P-30 Media , fine, 100 g	Rapid carbohydrate, peptide, and protein desalting; also available in prepacked columns and cartridges
1504160	Bio-Gel P-60 Media , medium, 100 g	
1504164	Bio-Gel P-60 Media , fine, 100 g	Purification of proteins and polypeptides
1504170	Bio-Gel P-100 Media , medium, 100 g	
1504174	Bio-Gel P-100 Media , fine, 100 g	
Catalog #	Description	

Prepacked Econo-Pac Columns

7322010 Econo-Pac 10DG Desalting Columns, 30

continues

Chromatography Resins

Size Exclusion Chromatography

www.bio-rad.com/sizeexclusion

Ordering Information

Description	Pack of 1	Pack of 5
Prepacked Bio-Scale Mini Cartridges		
Bio-Gel P-6 Media (Desalting), 5 ml	7324502	7324504
Bio-Gel P-6 Media, 10 ml	—	7325304
Bio-Gel P-6 Media, 50 ml	7325312	7325314
Catalog #	Description	
Adaptor Fittings		
7320111	Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to an FPLC system	
7320112	Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system	
7320113	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 Resin

Bio-Gel A 1.5 m resin, 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 resin may be used at pH 4–13 and at temperatures 2–30°C. The fractionation range is from 10,000–1,500,000 daltons.

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

Ordering Information

Catalog #	Description
151-0450	Bio-Gel A 1.5 m Media , fine, 500 ml

See Also

Resin sampler pack: page 98.
ENrich SEC columns: page 103.

Bio-Beads™ S-X Resins

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

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

Ordering Information

Catalog #	Description	Size, µm	ml/dry g*	Application**
1522150	Bio-Beads S-X1 Media , 100 g	40–80	7.5	1% cross-linked; for lipophilic polymers of MW 600–14,000
1522151	Bio-Beads S-X1 Media , 1 kg	40–80	7.5	1% cross-linked; for lipophilic polymers of MW 600–14,000
1522750	Bio-Beads S-X3 Media , 100 g	40–80	4.75	3% cross-linked; for organic compounds of MW ≤2,000
1523350	Bio-Beads S-X8 Media , 100 g	40–80	3.1	8% cross-linked; for organic compounds of MW ≤1,000
1523650	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 Resins

Macro-Prep HIC resins 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 resins are chemically and thermally stable. They can be cleaned in place with ethanol or 1% acetic acid and 1% phosphoric acid.

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	1580080	1580090
Macro-Prep HIC Media, 100 ml	1560080	1560090
Macro-Prep HIC Media, 500 ml	1560081	1560091
Macro-Prep HIC Media, 5 L	156-0082	—
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 and 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, cleanup of biological metabolites and pesticides, and cleanup 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
1523920	Bio-Beads SM-2 Adsorbents, 100 g
152-3922	Bio-Beads SM-2 Adsorbents, 1 kg
1523923	Bio-Beads SM-2 Adsorbents, 10 kg
1528920	Bio-Beads SM-2 Adsorbents, 25 g

Resin and Cartridge Sampler Packs, Kits, and Standards

Sampler Packs

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

- **Resin 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 resins
- **Deluxe resin sampler pack** — includes 100 ml bottles of the resins in the resin 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 resins
- **Bio-Scale Mini affinity sampler pack** — includes one 1 ml cartridge each of IMAC and Affi-Prep® protein A resins and one 5 ml cartridge each of DEAE Affi-Gel® Blue and Affi-Gel Blue resins



Resin Sampler and Deluxe Resin Sampler Packs



Bio-Scale Mini Cartridges



Bio-Scale Mini Ion Exchange and Affinity Sampler Packs

For More Information

Web: www.bio-rad.com/resinsampling

Ordering Information

Catalog #	Description
Process Scale Resins/Media	
1580100	Resin 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
1580150	Deluxe Resin Sampler Pack , includes 100 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, 100 g each of CHT ceramic hydroxyapatite Types I and II, 40 µm, and CFT ceramic fluoroapatite Type II, 40 µm
Lab Scale Resins/Media	
7324650	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
7324651	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 DEAE Affi-Gel Blue and Affi-Gel Blue

Process Scale Resins/Media

- | | |
|---------|--|
| 1580100 | Resin 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 |
| 1580150 | Deluxe Resin Sampler Pack , includes 100 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, 100 g each of CHT ceramic hydroxyapatite Types I and II, 40 µm, and CFT ceramic fluoroapatite Type II, 40 µm |

Lab Scale Resins/Media

- | | |
|---------|---|
| 7324650 | 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 |
| 7324651 | 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 DEAE Affi-Gel Blue and Affi-Gel Blue |

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 resin, UNOsphere™ Q resin, 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/resinsampling

See Also

Ion exchange resins: page 67.

Macro-Prep ion exchange resins: page 69.

UNOsphere and Nuvia ion exchange resins: page 67.

CHT ceramic hydroxyapatite: page 76.

CFT ceramic fluoroapatite: page 78.

Macro-Prep HIC resins: page 97.

Bio-Scale Mini cartridges: page 105.

Ordering Information

Catalog #	Description
7324407	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
7324408	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 resins, 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 B₁₂ 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

Chromatography Resins

Resin and Cartridge Sampler Packs, Kits, and Standards

www.bio-rad.com/chromstandards

Standard Specifications

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

Ordering Information

Catalog #	Description	Contents	MW	pI	For Use with
1250561	Protein Standard for Anion Exchange Chromatography, 6 vials	Equine myoglobin	17,000	6.9	ENrich Q Columns; UNO Q columns; Bio-Scale Mini UNOsphere Q cartridges; Macro-Prep High Q and DEAE media; UNOsphere Q media
		Conalbumin	77,000	4.9	
		Chicken ovalbumin	45,000	4.6	
		Soybean trypsin inhibitor	21,500	4.5	
1250562	Protein Standard for Cation Exchange Chromatography, 6 vials	Equine myoglobin	17,000	6.9	ENrich S Columns; UNO S columns; Bio-Scale Mini UNOsphere S cartridges; Macro-Prep High S and CM media; UNOsphere S media
		Ribonuclease A	13,500	8.7	
		Cytochrome c	12,000	10.7	
1250586	Organic Acid Analysis Standard, 6 vials	Sodium oxalate	134		Aminex HPX-87H column; organic acid analysis kit
		Sodium citrate	294		
		Sodium malate	196		
		Sodium succinate	270		
		Sodium formate	69		
		Sodium acetate	82		
1250585	Carbohydrate Analysis Standard, 6 vials	Melezitose	504		Aminex HPX-87H column; carbohydrate analysis kit
		Maltose	360		
		Glucose	180		
		Mannose	180		
		Fructose	180		
		Adonitol (ribitol)	152		
1511901	Gel Filtration Standard, 6 vials	Thyroglobulin	670,000	4.5	ENrich SEC columns; Bio-Gel P media
		Bovine γ-globulin	158,000	5.1	
		Chicken ovalbumin	44,000	4.6	
		Equine myoglobin	17,000	6.9	
		Vitamin B ₁₂	1,350	4.5	

Chromatography Columns

A complete range of prepacked and empty columns and accessories is 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 resins.

 [Learn More about the Technology](http://www.bio-rad.com/tech/chrom)
Web: www.bio-rad.com/tech/chrom

Prepacked Chromatography Columns

Prepacked Cartridge Selection Guide by Application

Application	Resin	Type of Separation	Chemical Form	Binding Capacity/ml
Protein and Plasmid Purification	Macro-Prep® High Q	Strong anion exchange	$-\text{N}^+(\text{CH}_3)_3$	≥37 mg BSA
	UNOsphere™ Q	Strong anion exchange	$-\text{N}^+(\text{CH}_3)_3$	180 mg BSA
	UNOsphere S	Strong cation exchange	$-\text{SO}_3^-$	60 mg human IgG
	Macro-Prep DEAE	Weak anion exchange	$-\text{HN}^+(\text{C}_2\text{H}_5)_2$	>35 mg protein
	UNOsphere Rapid S	Strong cation exchange	SO_3^-	Human IgG: 60 mg/ml*
	CHT™ ceramic hydroxyapatite	Hydroxyapatite	$(\text{Ca}_5(\text{PO}_4)_3\text{OH})_2$	Human IgG: 25–60 mg/ml*
	MPC™ ceramic hydroxyfluoroapatite	Hydroxyfluoroapatite	$\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_{1.5}(\text{F})_{0.5}$	Human IgG: 25–50 mg/ml
	CFT™ ceramic fluoroapatite	Fluoroapatite	$\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$	Lysozyme: 14–21.5 mg/g
Protein Purification	Nuvia™ Q	Strong anion exchange	$-\text{N}(\text{CH}_3)_3^+$	>170 mg/ml IgG at 300 cm/hr
	Nuvia™ cPrime™	Hydrophobic cation exchange	$-\text{N}(\text{CH}_3)_3^+$	>60 mg/ml lactoferrin; 40 mg/ml IgG
	Nuvia S	Strong cation exchange	$-\text{SO}_3^-$	110 mg/ml IgG
	Nuvia HR-S	High resolution strong cation exchange	$-\text{SO}_3^-$	≥70 mg/ml
	Macro-Prep High S	Strong cation exchange	$-\text{SO}_3^-$	≥49 mg human IgG
	UNOsphere Rapid S	Strong cation exchange	SO_3^-	Human IgG: 60 mg/ml*
	CHT ceramic hydroxyapatite	Hydroxyapatite	$(\text{Ca}_5(\text{PO}_4)_3\text{OH})_2$	Human IgG: 25–60 mg/ml*
	MPC ceramic hydroxyfluoroapatite	Hydroxyfluoroapatite	$\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_{1.5}(\text{F})_{0.5}$	Human IgG: 25–50 mg/ml
	CFT ceramic fluoroapatite	Fluoroapatite	$\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$	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	$-\text{N}(\text{CH}_3)_3^+$	>170 mg/ml IgG at 300 cm/hr
	Nuvia cPrime	Hydrophobic cation exchange	$-\text{N}(\text{CH}_3)_3^+$	>60 mg/ml lactoferrin; 40 mg/ml IgG
	Nuvia S	Strong cation exchange	$-\text{SO}_3^-$	110 mg/ml IgG
	Nuvia HR-S	High resolution strong cation exchange	$-\text{SO}_3^-$	≥70 mg/ml
	Affi-Prep® protein A	Affinity	Protein A	8–10 mg mouse monoclonal IgG, 16–23 mg human IgG
	CHT Type I, 40 μm	Hydroxyapatite	$(\text{Ca}_5(\text{PO}_4)_3\text{OH})_2$	25–60 mg human IgG
	CHT Type II, 40 μm	Hydroxyapatite	$(\text{Ca}_5(\text{PO}_4)_3\text{OH})_2$	15–25 mg human IgG
	MPC ceramic hydroxyfluoroapatite	Hydroxyfluoroapatite	$\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_{1.5}(\text{F})_{0.5}$	Human IgG: 25–50 mg/ml
	CFT	Fluoroapatite	$\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$	Lysozyme: 14–21.5 mg/g
Affinity-Tagged Protein Purification	UNOsphere SUPrA™	Affinity	rProtein A	Human IgG: 30 mg/ml*
	Nuvia™ IMAC	Affinity	Nitrilotriacetic acid (NTA)	≥40 mg recombinant histidine-tagged protein
	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

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

continues

Chromatography Columns

Prepacked Chromatography Columns

www.bio-rad.com/columns

Prepacked Cartridge Selection Guide by Application (cont.)

Application	Resin	Type of Separation	Chemical Form	Binding Capacity/ml
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 lactoferrin; 40 mg/ml IgG
	Nuvia S	Strong cation exchange	$-SO_3^-$	110 mg/ml IgG
	Nuvia HR-S	Strong cation	$-SO_3^-$	≥70 mg/ml
	UNOsphere SUPra	Affinity	rProtein A	Human IgG: 30 mg/ml*
	CHT Type I, 40 µm	Hydroxyapatite	$(Ca_5(PO_4)_3(OH))_2$	Human IgG: 25–60 mg/ml
	MPC ceramic	Hydroxyfluoroapatite	$Ca_{10}(PO_4)_6(OH)_{1.5}(F)_{0.5}$	Human IgG: 25–50 mg/ml
	UNOsphere Q	Strong anion exchange	$-N^+(CH_3)_3$	BSA 180 mg/ml*

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

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 in both 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 resin features:

- High capacity even at high flow rates
- Superior quality, reproducible separations
- Lower backpressure than similar resins
- Stability from pH 2–12
- 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 Flow Dimensions (W x L), mm	Max. Operating Pressure		
					psi	M Pa	bar
ENrich High Resolution Ion Exchange Columns							
7800001	ENrich Q 5 x 50 Column	1	100	5 x 50	500	3.45	34.5
7800003	ENrich Q 10 x 100 Column	8	800	10 x 100	500	3.45	34.5
7800021	ENrich S 5 x 50 Column	1	100	5 x 50	500	3.45	34.5
7800023	ENrich S 10 x 100 Column	8	800	10 x 100	500	3.45	34.5
Catalog #	Description						
Fittings							
7500564	1/4-28 Female to 10-32 Male Fittings, includes 2 ferrule-less fittings for attaching ENrich columns to the BioLogic DuoFlow System						
7500568	ENrich 10-32 Fittings Kit, includes 2 nuts and 4 ferrules to connect ENrich column to an HPLC system						
7800008	Fittings, 10-32 PEEK, black, 2/PK						

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 in both 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 resin features:

- High resolution based on size
- Superior quality, reproducible separations
- Lower backpressure than similar resins
- Stability from pH 2–12
- 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	M Pa	bar
ENrich High Resolution Ion Exchange Columns							
7801070	ENrich SEC 70 10 x 300 Column	24	500–70,000	10 x 300	600	4.1	41
7801650	ENrich SEC 650 10 x 300 Column	24	5,000–650,000	10 x 300	600	4.1	41
Catalog #	Description						
Fittings							
7500564	1/4-28 Female to 10-32 Male Fittings, includes 2 ferrule-less fittings for attaching ENrich columns to the BioLogic DuoFlow system						
7500568	ENrich 10-32 Fittings Kit, includes 2 nuts and 4 ferrules to connect ENrich column to an HPLC system						
7800008	Fittings, 10-32 PEEK, black, 2/PK						

Chromatography Columns

Prepacked Chromatography Columns

www.bio-rad.com/foresight

Foresight™ Prepacked Plates and Columns

Foresight plates and columns are prepacked with a range of Bio-Rad's process chromatography resins, 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 resin 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 resin 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
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Foresight Plates*

7324714	Foresight UNOsphere Q, 20 µl
7324710	Foresight UNOsphere S, 20 µl
7324712	Foresight UNOsphere Rapid S, 20 µl
7324709	Foresight UNOsphere SUPRA, 20 µl
7324703	Foresight Nuvia Q, 20 µl
7324701	Foresight Nuvia S, 20 µl
7324707	Foresight Nuvia HR-S, 20 µl
7324705	Foresight Nuvia cPrime, 20 µl
7324716	Foresight CHT Type I, 40 µm, 20 µl
7324718	Foresight CHT Type II, 40 µm, 20 µl
7324785	Foresight MPC Type I, 40 µm, 20 µl

continues

Ordering Information

Description	200 µl	600 µl
Foresight RoboColumn Units**,**		
Profinity IMAC Ni-Charged Resin	7324200	7324202
Foresight UNOsphere Q RoboColumn Units	7324819	7324820
Foresight UNOsphere S RoboColumn Units	7324813	7324814
Foresight UNOsphere Rapid S RoboColumn Units	7324816	7324817
Foresight UNOsphere SUPra RoboColumn Units	7324834	7324835
Foresight Nuvia Q RoboColumn Units	7324804	7324805
Foresight Nuvia S RoboColumn Units	7324801	7324802
Foresight Nuvia HR-S RoboColumn Units	7324831	7324832
Foresight Nuvia cPrime RoboColumn Units	7324807	7324808
Foresight CHT Type I RoboColumn Units, 40 µm	7324822	7324823
Foresight CHT Type II RoboColumn Units, 40 µm	7324825	7324826
Foresight MPC Type I RoboColumn Units, 40 µm	7324828	7324829
Description	1 ml	5 ml
Foresight Columns		
Foresight UNOsphere Q	7324732	7324752
Foresight UNOsphere S	7324730	7324750
Foresight UNOsphere Rapid S	7324731	7324751
Foresight UNOsphere SUPra	7324729	7324749
Foresight Nuvia Q	7324721	7324741
Foresight Nuvia S	7324720	7324740
Foresight Nuvia HR-S	7324723	7324743
Foresight Nuvia cPrime	7324722	7324742
Foresight CHT Type I, 40 µm	7324735	7324755
Foresight CHT Type II, 40 µm	7324736	7324756
Foresight MPC Type I, 40 µm	7324737	7324757

* 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-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 resins 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.



Chromatography Columns

Prepacked Chromatography Columns

www.bio-rad.com/cartridges

See Also

Bottled resins:
page 65.
BioLogic systems:
page 132.
Econo pump:
page 153.

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	—	7324100	7324102	7324104
UNOsphere S Media	—	7324110	7324112	7324114
UNOsphere SUPra rProtein A Media	7324200	7324201	7324202	—
UNOsphere Rapid S Media	—	7324400	7324401	7324402
Nuvia S Media	7324420	7324421	7324422	7324423
Macro-Prep High Q Media	—	7324120	7324122	7324124
Macro-Prep High S Media	—	7324130	7324132	7324134
Macro-Prep DEAE Media	—	7324140	7324142	7324144
Affi-Prep Protein A Media	—	7324600	7324602	—
Nuvia IMAC	—	—	7800811	7800812
Profinity IMAC Ni-Charged Resin	—	7324610	7324612	7324614
Profinity GST Resin	—	7324620	7324622	7324624
DEAE Affi-Gel Blue Media	—	—	7324632	7324634
Affi-Gel Blue Media	—	—	7324642	7324644
CHT Type I, 40 µm Media	—	—	7324322	7324324
CHT Type II, 40 µm Media	—	—	7324332	7324334
CFT Type II Media	—	—	7324405	7324406

Description	Pack of 1	Pack of 5
Bio-Gel P-6 Media, 10 ml	—	7325304
Bio-Gel P-6 Media, 50 ml	7325312	7325314

Catalog # Description

Bio-Scale Mini Cartridge Kits

7324407	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
7324408	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

7320111	Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to an FPLC system
7320112	Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system
7320113	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
7885010	Luer to 10-32 Adaptor Fittings Kit , includes female slip luer to female 10-32 fitting to connect male end of luer column to NGC 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 101.

For More Information

Web: www.bio-rad.com/resinsampling

Ordering Information

Catalog #	Description
7324650	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
7324651	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

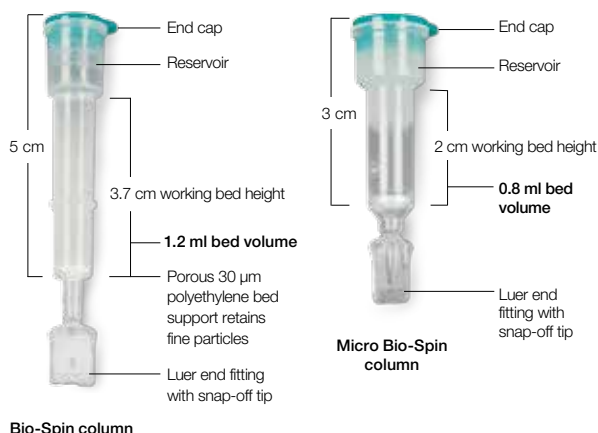
Adaptor Fittings

7320111	Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to an FPLC system
7320112	Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to an HPLC or NGC system
7320113	Luer to 1/4-28 Adaptor Fittings Kit , includes luer to 1/4-28 fittings to connect 1 cartridge to a BioLogic DuoFlow system
7885010	Luer to 10-32 Adaptor Fittings Kit , includes female slip luer to female 10-32 fitting to connect male end of luer column to NGC 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 resin, 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 (Bio-Spin columns)
- Accommodate up to 70 µl of sample (Micro Bio-Spin columns)



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.

See Also

Nucleic acid sample preparation: page 21.

Chromatography Columns

Prepacked Chromatography Columns

www.bio-rad.com/columns

Ordering Information

Catalog #	Description
7326227	Bio-Spin 6 Columns , 25 with Tris buffer
7326228	Bio-Spin 6 Columns , 100 with Tris buffer
7326221	Micro Bio-Spin 6 Columns , 25 with Tris buffer
7326222	Micro Bio-Spin 6 Columns , 100 with Tris buffer
7326006	Bio-Spin 30 Columns , 25 with SSC buffer
7326216	Bio-Spin 30 Columns , 1,000 with SSC buffer
7326202	Micro Bio-Spin 30 Columns , 25 with SSC buffer
7326203	Micro Bio-Spin 30 Columns , 100 with SSC buffer

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 resin for both affinity-tagged purification and protein enrichment applications and contain the following resins:

- **Profinity eXact™ resins** — for affinity-tagged purification and on-column cleavage; see page 83
- **ProteoMiner™ beads** — for protein enrichment of low-abundance proteins from biological samples; see page 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
1563007*	Profinity eXact Mini Spin Columns , includes ten 0.6 ml spin columns, ten 2 ml capped tubes, and ten 2 ml capless tubes

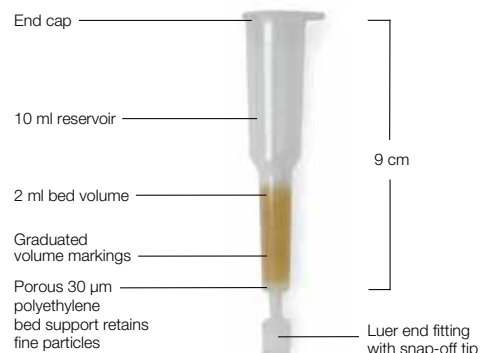
* For ProteoMiner mini spin columns, see page 8.

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
7316211	Poly-Prep Columns , AG 1-X8 resin, 100–200 mesh, 50	106–180	Chloride	Separation of low molecular weight inorganic anions
7316212	Poly-Prep Columns , AG 1-X8 resin, 200–400 mesh, 50	45–106	Chloride	For high-resolution random separations
7316221	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
7316213	Poly-Prep Columns , AG 50W-X8, 100–200 mesh, 50	106–250	Hydrogen	Separation and concentration of low molecular weight cations such as small peptides and amino acids
7316214	Poly-Prep Columns , AG 50W-X8, 200–400 mesh, 50	63–150	Hydrogen	For high-resolution random separations
7311555	Poly-Prep Column Stack Cap , 50			Allows connection of pumps, reservoirs, or columns in series
7328102	Stopcock, Lock 2-Way Luer , 10			Provides control of flow through Poly-Prep columns

Bio-Scale™ CHT™ Type I Columns

Bio-Scale CHT Type I columns are packed with CHT ceramic hydroxyapatite, Type I 10 μm resin, 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 120.
NGC systems: pages 121.
CHT ceramic hydroxyapatite: page 76.
Bio-Scale Mini cartridges: page 105.

Ordering Information

Catalog #	Description	Column Volume, ml	Recommended Flow Rate, ml/min	Recommended Flow Rate, ml/min	Column Dimensions (W x L), mm	Max. Operating Pressure, psi
7510021	Bio-Scale CHT2-I Column	2	20	0.5–3.0	7 x 52	1,000
7510023	Bio-Scale CHT5-I Column	5	50	0.5–5.0	10 x 64	750
7510025	Bio-Scale CHT10-I Column	10	100	0.5–7.0	12 x 88	600
7510027	Bio-Scale CHT20-I Column	20	200	0.5–10.0	15 x 113	500
7510029	Top-off Resin Kit, CHT-I , 1 ml					

Chromatography Columns

Prepacked Chromatography Columns

www.bio-rad.com/columns

See Also

UNOsphere ion exchange resin: page 65.

NGC systems: page 121.

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.

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

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

Ordering Information

Catalog #	Description	Column Volume,	Recommended	Recommended	Column Flow	Max. Operating Pressure		
		ml	Max. Protein Load, mg/column	Flow Rate, ml/min	Dimensions (W x L), mm	psi	M Pa	bar
7200001	UNO Q1 Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
7200003	UNO Q6 Column	6	90	0.5–8.0	12 x 53	700	4.5	48
7200005	UNO Q12 Column	12	180	0.5–8.0	15 x 68	700	4.5	48
7200021	UNO S1 Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
7200023	UNO S6 Column	6	90	0.5–8.0	12 x 53	700	4.5	48
7200025	UNO S12 Column	12	180	0.5–8.0	15 x 68	700	4.5	48
UNO Replacement Columns								
7200011	UNO Q1R Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
7200013	UNO Q6R Column	6	90	0.5–8.0	12 x 53	700	4.5	48
7200015	UNO Q12R Column	12	180	0.5–8.0	15 x 68	700	4.5	48
7200031	UNO SR1 Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
7200033	UNO S6R Column	6	90	0.5–8.0	12 x 53	700	4.5	48
7200035	UNO S12R Column	12	180	0.5–8.0	15 x 68	700	4.5	48
UNO Polishing PEEK Column								
7200009	UNO Q Polishing Column	0.16	2	0.1–1.0	4.6 x 10	200	1.3	14
7200029	UNO S Polishing Column	0.16	2	0.1–1.0	4.6 x 10	200	1.3	14
Catalog #	Description							
Fittings								
7500554	1/16" OD (1.6 mm) Post-Pump Fittings, includes Delrin nut, ferrules, lock ring, 10 sets							
7500568	UNO 10-32 Fittings Kit, includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system							
7500567	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 resin has 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.

Aminex columns are commonly used for USP methods under the "L" specification. Specific designations are listed in the table below.

For More Information

Web: www.bio-rad.com/aminex

Request or download bulletin: 1928, 6333



See A Iso

Organic acid standard: page 99.

Carbohydrate standard: page 99.

Ordering Information

Catalog #	Description	Guard Column*	Applications	Particle Size, µm	Ionic Form	Cross-Linkage %	pH Range
Carbohydrate Analysis Columns							
1250143	Aminex HPX-87N Column , 300 x 7.8 mm	1250508	Beet sugars (USP L58)	9	Sodium	8	5–9
1250142	Aminex HPX-87K Column , 300 x 7.8 mm	1250507	Molasses, corn	9	Potassium	8	5–9
1250095	Aminex HPX-87C Column , 300 x 7.8 mm	1250128 or 1250503	High fructose corn syrup (USP L19)	9	Calcium	8	5–9
1250094	Aminex HPX-87C Column , 250 x 4.0 mm	1250128 or 1250503	Sugar alcohols (USP L19)	9	Calcium	8	5–9
1250098	Aminex HPX-87P Column , 300 x 7.8 mm	1250119 or 1250118	Pentose sugars, cellulose hydrolysates, biofuels (USP L34)	9	Lead	8	5–9
1250140	Aminex HPX-87H Column , 300 x 7.8 mm	1250129 or 1250502	Sugars with organic acids, biofuels (USP L17)	9	Hydrogen	8	1–3
1250096	Aminex HPX-42C Column , 300 x 7.8 mm	1250128 or 1250503	Oligosaccharides, thickening agents	25	Calcium	4	5–9
1250097	Fast Carbohydrate Column , 100 x 7.8 mm	1250119 or 1250118	Glucose, galactose, sucrose, fructose	9	Lead	8	5–9
1250105	Fast Carbohydrate Column , 100 x 7.8 mm	1250119 or 1250118	Glucose, galactose, sucrose, fructose	9	Lead	8	5–9
Organic Acid and Alcohol Columns							
1250140	Aminex HPX-87H Column , 300 x 7.8 mm	1250129 or 1250502	Sugars with organic acids, fermentation monitoring, biofuels	9	Hydrogen	8	1–3
1250100	Fast Acid Analysis Column , 100 x 7.8 mm	1250129 or 1250502	Alcohol, glycol organic acid analysis	9	Hydrogen	8	1–3
1250115	Fermentation Monitoring Column , 150 x 7.8 mm	1250129 or 1250502	Sugar, acids, alcohols	9	Hydrogen	8	1–3
Application Kits for Food Analysis**							
1250233	Carbohydrate Analysis Kit	Included	Carbohydrates	9	Calcium	8	5–9
1250234	Organic Acid Analysis Kit	Included	Organic acids	9	Hydrogen	8	1–3

continues

Chromatography Columns

Prepacked Chromatography Columns

www.bio-rad.com/columns

Ordering Information

Catalog #	Description	Applications	Ionic Form	pH Range
Micro-Guard Cartridges				
1250118***	De-Ashing Refill Cartridges, 30 x 4.6 mm, 2	Aminex silver- and lead-form columns	H ⁺ and CO ₃ ⁻	6–8
1250119	Carbo-P Refill Cartridges, 30 x 4.6 mm, 2	Aminex HPX-87P column	Lead	5–9
1250128	Carbo-C Refill Cartridges, 30 x 4.6 mm, 2	Aminex calcium-form columns	Calcium	5–9
1250129	Cation H Refill Cartridges, 30 x 4.6 mm, 2	Aminex hydrogen-form columns	Hydrogen	1–3
1250502†	IG Cation H Cartridges, 30 x 4.6 mm, 2	Aminex hydrogen-form columns	Hydrogen	1–3
1250503†	IG Carbo-C Cartridges, 30 x 4.6 mm, 2	Aminex calcium-form columns	Calcium	5–9
1250506	Anion CO ₃ ⁻ Cartridges, 30 x 4.6 mm, 2	Aminex silver- and lead-form columns	CO ₃ ⁻	—
1250507	Cation K ⁺ Cartridges, 30 x 4.6 mm, 2	Aminex HPX-87K column	Potassium	5–9
1250508	Cation Na ⁺ Cartridges, 30 x 4.6 mm, 2	Aminex HPX-87N column	Sodium	5–9
Cartridge Holders and Accessories				
1250131	Standard Cartridge Holder, for one 30 x 4.6 mm cartridge			
1250147	Cartridge Holder Seal Replacement Kit, for #1250131			
1250148	Cartridge Holder Seals, for #1250131			
1250139	De-Ashing Cartridge Holder, for #1250118, holds two 3.0 x 4.6 mm cartridges in series			
7800008	Fittings, 10-32 PEEK, black, 2/PK			

* Supplied as 2 guard columns.

** Includes 1 column and 2 Micro-Guard cartridges; requires standard cartridge holder, catalog #1250131.

*** Requires de-ashing cartridge holder, #1250139.

† IG = industrial grade; larger particle size allows for higher flowrates in lower resolution applications.

See Also

Affi-Gel protein A
MAPS II kit: page 89.

Affi-Gel protein A
resin: page 89.

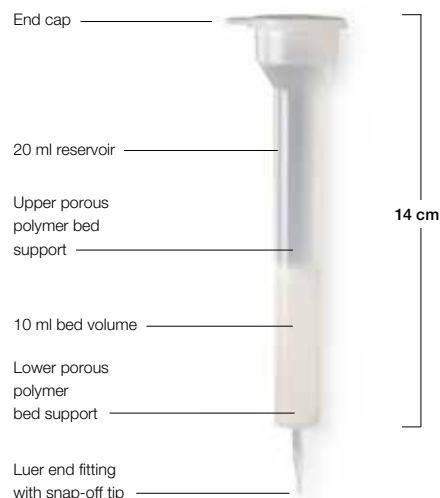
DEAE Affi-Gel Blue
resin: page 90.

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 resin, are well suited for obtaining highly pure IgG from a variety of species from serum samples. The Econo-Pac 10DG resin, 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 below. For bottled size exclusion resins, see page 95; for bottled affinity resins, see page 80; and for activated affinity resins, see page 93.



Ordering Information

Catalog #	Description
7322022	Econo-Pac Protein A Columns, prefilled with Affi-Gel protein A media, 5
7322020	Econo-Pac Protein A Kit, 1 x 2 ml Affi-Gel protein A column, 1 x 10 ml 10DG column, buffers
7322026	Econo-Pac Serum IgG Purification Column, prefilled with DEAE Affi-Gel Blue gel, 5
7322027	Econo-Pac Serum IgG Purification Kit, 5 x 5 ml DEAE Affi-Gel Blue columns, 5 x 10 ml 10DG columns, buffers
7322010	Econo-Pac 10DG Desalting Columns, 30
7380019	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

Empty Bio-Spin and Micro Bio-Spin chromatography columns are disposable polypropylene spin columns that can be packed with a variety of chromatographic resins. Bio-Spin columns hold up to 1.2 ml of any resin 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

resin 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

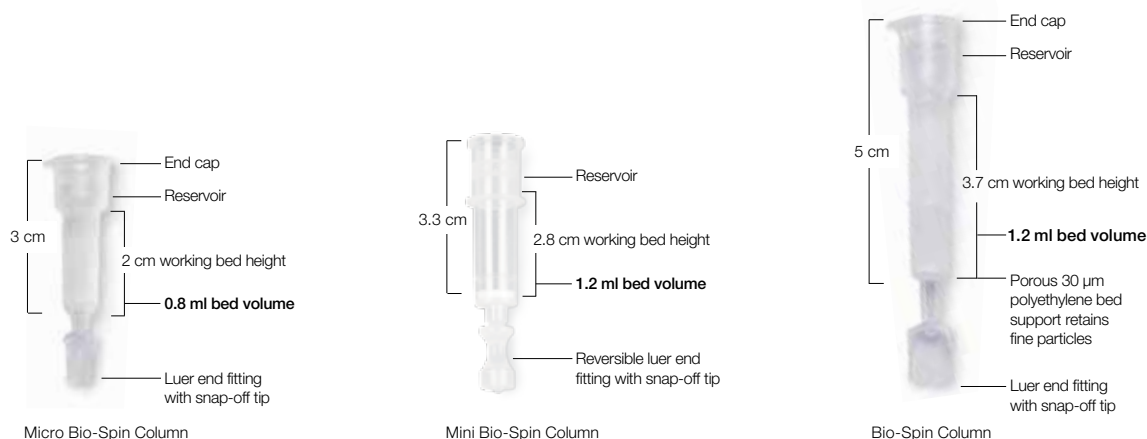
Web: www.bio-rad.com/spincolumns

Request or download bulletin: 2289

See Also

Nucleic acid sample preparation: page 21.

Prepacked Bio-Spin and Micro Bio-Spin columns: page 107.



Ordering Information

Catalog #	Description
7326008	Bio-Spin Chromatography Columns , empty, 100
7326025	Bio-Spin Chromatography Columns , empty, 1,000
7326204	Micro Bio-Spin Chromatography Columns , empty, 100
7326207	Mini Bio-Spin Chromatography Columns , empty, 100
7311660	End Caps , for Micro Bio-Spin chromatography columns, 1,000

Chromatography Columns

Empty Columns

www.bio-rad.com/spincolumns

See Also

Prepacked
Econo-Pac columns:
page 112.

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 below) 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



Poly Column Rack



Ordering Information

Catalog #	Description
7321010	Econo-Pac Chromatography Columns , empty, includes upper bed supports, end caps, tip closures, 50
7321011	Econo-Pac Chromatography Columns , empty, includes upper bed supports, end caps, tip closures, 500

Accessories

7380019	Econo-Pac Flow Adaptor , 1.5 cm column ID
7317005	Poly Column Rack , 20-place, with removable tube rack
7328102	2-Way Stopcocks , female-to-male luer, 10
7318232	Female Luer Plugs , 25, polypropylene
7311660	End Caps , for Econo-Pac columns, 1,000

See Als

Prepacked Poly-Prep
columns: page 106.

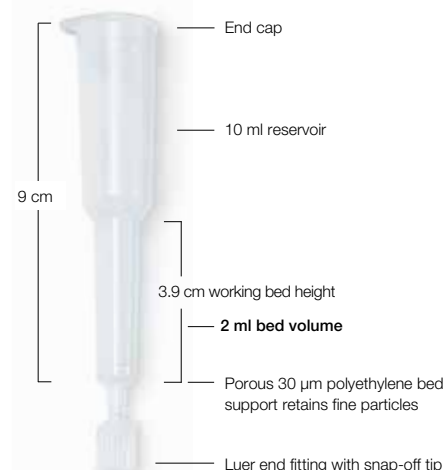
Poly-Prep® Columns

Poly-Prep columns are 9 cm high, conical 0.8 x 4 cm polypropylene columns that hold up to 2 ml of chromatography resin 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

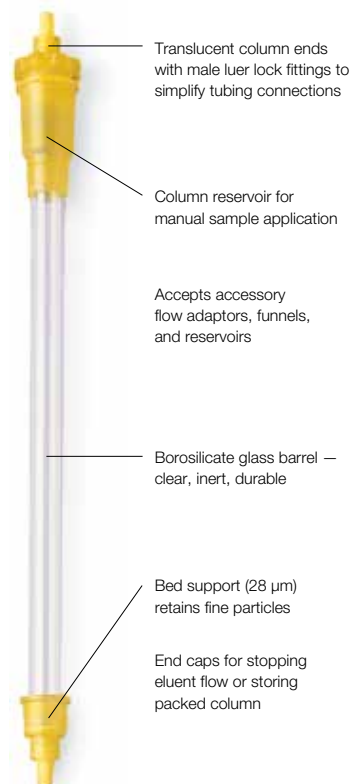
Catalog #	Description
7311550	Poly-Prep Chromatography Columns , empty, includes end caps and tip closures, 50
7311553	Poly-Prep Chromatography Columns , empty, includes end caps and tip closures, 1,000

Accessories

7311555	Poly-Prep Column Stack Cap , 50
7317005	Poly Column Rack , 20-place, with removable tube rack
7328102	2-Way Stopcocks , female-to-male luer, 10
7318232	Female Luer Plugs , polypropylene, 25
7311660	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 to 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

Chromatography Columns

Empty Columns

www.bio-rad.com/econocolumns

Ordering Information

Catalog #	ID, cm	Length, cm	Cross-Sectional Area, cm ²	Maximum Volume, ml	Columns/Pkg
7370507	0.5	5	0.20	1	2
7370512	0.5	10	0.20	2	2
7370517	0.5	15	0.20	3	2
7370522	0.5	20	0.20	4	2
7370707	0.7	5	0.39	2	2
7370712	0.7	10	0.39	4	2
7370717	0.7	15	0.39	6	2
7370722	0.7	20	0.39	8	2
7370732	0.7	30	0.39	12	2
7370752	0.7	50	0.39	20	2
7374506	0.5	5	0.20	1	4
7374511	0.5	10	0.20	2	4
7374516	0.5	15	0.20	3	4
7374521	0.5	20	0.20	4	4
7374706	0.7	5	0.39	2	4
7374711	0.7	10	0.39	4	4
7374716	0.7	15	0.39	6	4
7374721	0.7	20	0.39	8	4
7374731	0.7	30	0.39	12	4
7374751	0.7	50	0.39	20	4
7374006	1.0	5	0.79	4	4
7371007	1.0	5	0.79	4	2
7374011	1.0	10	0.79	8	4
7371012	1.0	10	0.79	8	2
7374021	1.0	20	0.79	16	4
7371022	1.0	20	0.79	16	2
7374031	1.0	30	0.79	24	4
7371032	1.0	30	0.79	24	2
7374051	1.0	50	0.79	40	4
7371052	1.0	50	0.79	40	2
7371091	1.0	100	0.79	79	2
7371093	1.0	120	0.79	103	2
7374150	1.5	5	1.77	9	4
7371507	1.5	5	1.77	9	2
7374151	1.5	10	1.77	18	4
7371512	1.5	10	1.77	18	2
7374156	1.5	15	1.77	27	4
7371517	1.5	15	1.77	27	2
7374152	1.5	20	1.77	35	4
7371522	1.5	20	1.77	35	2
7374153	1.5	30	1.77	53	4
7371532	1.5	30	1.77	53	2
7374155	1.5	50	1.77	89	4
7371552	1.5	50	1.77	89	2
7371576	1.5	75	1.77	124	2
7371591	1.5	100	1.77	177	2
7371593	1.5	120	1.77	230	2
7371598	1.5	170	1.77	301	2
7374250	2.5	5	4.91	25	4
7372507	2.5	5	4.91	25	2
7374251	2.5	10	4.91	49	4
7372512	2.5	10	4.91	49	2
7374252	2.5	20	4.91	98	4
7372522	2.5	20	4.91	98	2
7374253	2.5	30	4.91	147	4
7372532	2.5	30	4.91	147	2
7372551	2.5	50	4.91	246	2

continues

Ordering Information

Catalog #	ID, cm	Length, cm	Cross-Sectional Area, cm ²	Maximum Volume, ml	Columns/Pkg
7372576	2.5	75	4.91	344	2
7372591	2.5	100	4.91	491	2
7372593	2.5	120	4.91	589	2
7375011	5.0	10	19.63	196	1
7375021	5.0	20	19.63	393	1
7375031	5.0	30	19.63	589	1
7375051	5.0	50	19.63	982	1
7375071	5.0	70	19.63	1,374	1

Catalog #	Description
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Econo-Column Selection Packs

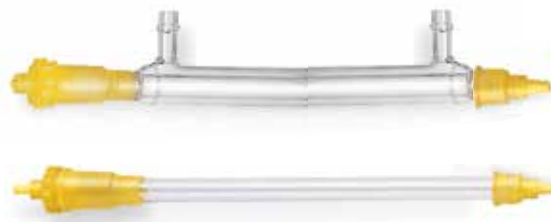
7376601	Econo-Column Selection Pack A , includes 7 columns, 1 each of 0.7 x 10, 20, and 30 cm; 1.5 x 30 and 50 cm; 2.5 x 20 and 50 cm
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7376607	Econo-Column Selection Pack B , includes 6 columns, 1 each of 1.0 x 20, 30, and 50 cm; 1.5 x 20, 30, and 50 cm
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For fittings, see low-pressure fittings on page 149.

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.



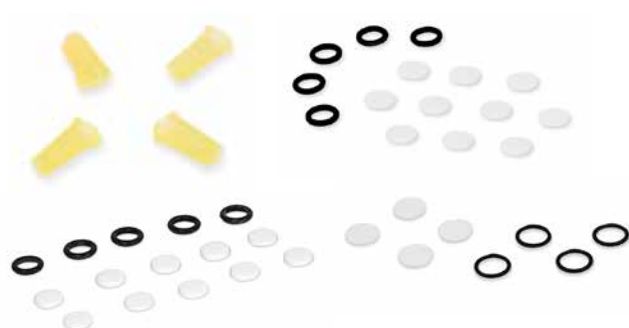
Ordering Information

Catalog #	Description	ID, cm	Length, cm	Cross-Sectional Area, cm ²	Maximum Volume, ml	Columns/Pkg
7376108	Econo-Column Jacketed Column	0.7	15	0.37	6	1
7376116	Econo-Column Jacketed Column	1.0	15	0.79	12	1
7376131	Econo-Column Jacketed Column	1.0	30	0.79	25	1
7376151	Econo-Column Jacketed Column	1.5	50	1.77	89	1
7376201	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.

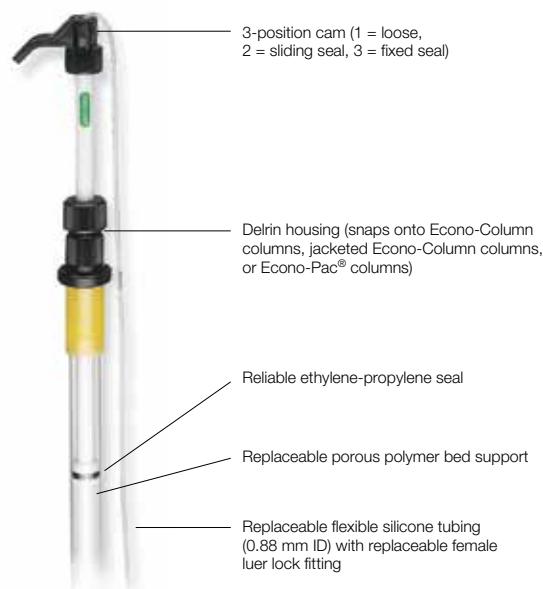
Econo-Column flow adaptors are available for 1.0, 1.5, 2.5, and 5.0 cm ID Econo-Column chromatography columns (page 115), jacketed Econo-Column chromatography columns (page 117), and Econo-Pac® columns (page 114). Due to wear and tear of bed supports and O-rings, maintenance kits are available for standard upkeep of flow adaptors.



For More Information

Web: www.bio-rad.com/econocolumnaccessories

Request or download bulletin: 2289



Ordering Information

Catalog #	Description
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Flow Adaptors

7380014	Flow Adaptor , 1.0 cm column ID, 1–7 cm functional length
7380015	Flow Adaptor , 1.0 cm column ID, 1–14 cm functional length
7380016	Flow Adaptor , 1.5 cm column ID, 1–14 cm functional length
7380017	Flow Adaptor , 2.5 cm column ID, 1–14 cm functional length
7380018	Flow Adaptor , 5.0 cm column ID, 1–14 cm functional length (does not include cam mechanism)

Flow Adaptor Maintenance Kits

7380022	Flow Adaptor Maintenance Kit , for 5.0 cm flow adaptor, includes 2 bed supports and 2 O-rings
7380024	Flow Adaptor Maintenance Kit , for 1.0 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings
7380025	Flow Adaptor Maintenance Kit , for 1.5 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings
7380027	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 (page 115), jacketed Econo-Column chromatography columns (page 117), Poly-Prep® columns (page 114), and Econo-Pac® columns (page 114).

**Ordering Information**

Catalog #	Description
7310003	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.

**Ordering Information**

Catalog #	Description
7379112	Econo-Column Reservoir , 500 ml
7379113	Econo-Column Reservoir , 1 L

Chromatography Columns

Empty Columns

www.bio-rad.com/econocolumns

See Also

Bio-Scale CHT columns: page 109.

UNO columns: page 110.

BioLogic DuoFlow systems: page 132.

Bio-Scale Mini cartridges: page 105.

Bio-Scale™ MT High-Resolution Columns

Bio-Scale MT empty columns can be packed with the resin 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*			
7510081	Bio-Scale MT2 Column , 7 x 52 mm	1.9–2.3	1,000
7510083	Bio-Scale MT5 Column , 10 x 64 mm	4.6–5.7	750
7510085	Bio-Scale MT10 Column , 12 x 88 mm	9.5–11.3	600
7510087	Bio-Scale MT20 Column , 15 x 113 mm	19.4–21.9	500

Catalog #	Description
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Cartridge Holders and Accessories

7510091	Bio-Scale 2 Replacement Parts Kit , includes 5 frits, 5 distribution screens, 2 O-rings, 1 frit remover
7510093	Bio-Scale 5 Replacement Parts Kit
7510095	Bio-Scale 10 Replacement Parts Kit
7510097	Bio-Scale 20 Replacement Parts Kit
7500554	1/16" OD (1.6 mm) Post-Pump Fittings , includes Delrin nut, ferrules, lock ring, 10 sets
7500567	UNO M6 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system
7500568	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.

Medium-Pressure Chromatography Systems

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 autosampler.



BioFrac Fraction Collector
(see page 143)



C-96 Autosampler
(see page 141)

Medium-Pressure Chromatography Systems

www.bio-rad.com/NGCsystems

NGC Chromatography Systems Selection Guide

Product	Catalog #	NGC™ Quest 10 7880001	NGC Quest 10 Plus 7880003	NGC Quest 100 7880002	NGC Quest 100 Plus 7880004	NGC™ Scout 10 7880005	NGC Scout 10 Plus 7880007	NGC Scout 100 7880006	NGC Scout 100 Plus 7880008	NGC™ Discover 10 7880009	NGC Discover 100 7880010	NEW NGC Discover Pro 10 7880011	NEW NGC Discover Pro 100 7880012
NGC F10 pump module	7884002	•	•			•	•			•		•	
NGC F100 pump module	7884003			•	•			•	•		•		•
NGC mixer module	7884018	•	•	•	•	•	•	•	•	•	•	•	•
NGC sample inject valve module	7884007	•	•	•	•	•	•	•	•	•	•	•	•
NGC single-wavelength detector module	7884008	•		•		•		•					
NGC multi-wavelength detector module	7884009		•		•		•		•	•	•	•	•
NGC buffer blending valve module	7884010					•	•	•	•	•	•	•	•
NGC pH valve module (includes pH probe)	7884011					•	•	•	•	•	•	•	•
NGC sample pump module	7884004									•	•	•	•
NGC inlet valve module	7884006									•	•	•	•
NGC outlet valve module	7884013											•	•
NGC column switching valve module, 10 ml	7884012									•		•	
NGC column switching valve module, 100 ml	7884026										•		•
ChromLab™ software	7886000	•	•	•	•	•	•	•	•	•	•	•	•
NGC chromatography system and ChromLab software documentation	7886500	•	•	•	•	•	•	•	•	•	•	•	•

Note: All NGC systems include a touch screen and 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 allows 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™ feature lighting provides step-by-step LED guided setup for easy system plumbing
- Real-time active flow path display for clear visualization of buffer, sample and valve position, and easy identification of system status
- Real-time module status displays offer immediate system diagnostics
- Pre-plumbed systems with QC-validated performance support 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 is compatible with all medium-pressure chromatography columns and resins
- BioFrac fraction collector compatibility allows for fraction collection from analytical to preparative scale purifications
- Compact footprint fits on lab bench, in deli-fridge, or in 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 sensitivity conductivity measurements

NGC Quest 10 Plus and Quest 100 Plus systems feature:

- Multi-wavelength (4) detector for simultaneous detection (190 to 800 nm) of proteins, peptides, nucleic acids, chromophores, and other biomolecular complexes with high sensitivity conductivity measurements for accurate salt gradient formation

NGC Scout™ and NGC Scout Plus

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

All NGC Scout 10 and Scout 100 systems include:

- All features of NGC Quest systems
- Buffer blending to automate buffer titrations for rapid scouting of pH 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

NEW NGC Discover and Discover Pro

Both the NGC Discover and NGC Discover Pro chromatography systems are designed for higher throughput applications with rapid, robust automation for those that need to do method development.

Both NGC Discover 10 systems include the capabilities of the NGC Scout 10 Plus instruments but also comprise:

- A 100 ml/min integrated sample pump — supports contamination-free automated large volume sample application
- Inlet valves — enable automated switching between buffers and samples, accelerating method development. NGC supports up to 2 inlet valves for buffers and 2 inlet valves for samples
- A column switching valve — facilitates automated column/media scouting up to 5 columns without the need to replumb. NGC supports up to 3 column switching valves
- A sample outlet valve, available as a standard feature with the NGC Discover Pro systems — allows the collection of up to 12 large-volume fractions. NGC supports up to 2 outlet valves

Ordering Information

Catalog # Description

NGC Medium-Pressure Chromatography Systems*

7880001	NGC Quest 10 Chromatography System , includes automated 10 ml/min pumps, single-wavelength (UV) and conductivity detection, accurate gradients, and sample injection
7880003	NGC Quest 10 Plus Chromatography System , includes automated 10 ml/min pumps, multi-wavelength (UV/Vis) and conductivity detection, accurate gradients, and sample injection
7880002	NGC Quest 100 Chromatography System , includes automated 100 ml/min pumps, single-wavelength (UV) and conductivity detection, accurate gradients, and sample injection
7880004	NGC Quest 100 Plus Chromatography System , includes automated 100 ml/min pumps, multi-wavelength (UV/Vis) and conductivity detection, accurate gradients, and sample injection
7880005	NGC Scout 10 Chromatography System , includes NGC Quest 10 capability, automated 10ml/min pumps, pH valve and buffer blending valve for automated gradient and buffer blending
7880007	NGC Scout 10 Plus Chromatography System , includes NGC Quest 10 Plus capability, automated 10ml/min pumps, pH valve and buffer blending valve for automated gradient and buffer blending
7880006	NGC Scout 100 Chromatography System , includes NGC Quest 100 capability, automated 100ml/min pumps, pH valve and buffer blending valve for automated gradient and buffer blending
7880008	NGC Scout 100 Plus Chromatography System , includes NGC Quest 100 Plus capability, automated 100ml/min pumps, pH valve and buffer blending valve for automated gradient and buffer blending
7880009	NGC Discover 10 Chromatography System , includes NGC Scout 10 Plus capability, automated 10ml/min pumps, sample pump for large sample injection, column switching valve (up to 5 columns) and buffer inlet valve
7880010	NGC Discover 100 Chromatography System , includes NGC Scout 100 Plus capability, automated 100ml/min pumps, sample pump for large sample injection, column switching valve (up to 5 columns) and buffer inlet valve
7880011	NGC Discover Pro 10 Chromatography System , includes NGC Scout 10 Plus capability, automated 10ml/min pumps, sample pump for large sample injection, column switching valve (up to 5 columns), buffer inlet valve and outlet valve
7880012	NGC Discover Pro 100 Chromatography System , includes NGC Scout 100 Plus capability, automated 100ml/min pumps, sample pump for large sample injection, column switching valve (up to 5 columns) and buffer inlet valve and outlet valve

* All NGC systems include ChromLab software.

Module Overview

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 on an F10 pump and F100 pump.



NGC Buffer Blending Valve Module

NGC Inlet Valve Module

The NGC inlet valve module allows for automatic buffer and sample selection during method development. It speeds up method development by allowing for automatic selection of up to seven buffers and a cleaning solution per valve. It also works as a mini autosampler for injecting multiple large volume samples via the sample pump.



NGC Inlet Valve Module

NGC F10 and F100 System Pump Modules

The F10 and F100 pumps produce buffer gradient 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 resin 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. The C-96 autosampler can also be plumbed through the inject valve to enable multiple small volume sample injections.

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 chromophores such as hemoglobin.

NEW NGC Outlet Valve Module

Use the NGC outlet valve either as a stand-alone unit or in conjunction with the BioFrac™ Fraction Collector (#7410002).

As a single, stand-alone unit, the outlet valve is capable of collecting up to 12 large-volume fractions such as flowthrough or waste. Two outlet valves may be daisy-chained to collect up to 23 large-volume fractions, including waste.

When a BioFrac fraction collector is connected the collection sequence can be programmed to collect smaller-volume fractions in the BioFrac fraction collector and larger-volume fractions via the outlet valves, providing full flexibility.



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)
Max pressure limit	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)
Max pressure limit	1,450 psi (100 bar, 10 MPa)

Sample Pump 100

Flow rate	up to 100 ml/min
Max pressure limit	1,450 psi (100 bar, 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)

Features and benefits of the NGC outlet valve module include:

- Collect up to 12 large-volume fractions with a single valve
- Collect up to 23 large-volume fractions with two valves
- Collect variable fraction sizes with the BioFrac fraction collector

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 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 μ l and 750 μ l) and F100 mixers (2, 5, and 12 ml). 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 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). Each NGC air sensor extension module can be used in conjunction with the air sensor module 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 resin 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 141 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 143 for detailed product information.

Medium-Pressure Chromatography Systems

www.bio-rad.com/NGCmodules

Ordering Information

Catalog # Description

NGC Medium-Pressure Chromatography System Modules and Accessories

System Pumps

7884002	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
7884003	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

7884004	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
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Detectors

7884008	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
7884009	NGC Multi-Wavelength Detector Module , for simultaneous wavelength (4) monitoring of elution fractions 190–800 nm and generation of salt gradients; UV/Vis, conductivity detector kit includes necessary tubing and fittings
7885024	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
7885023	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
7885022	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
7500230	Backpressure Regulator , 40 psi, restricts flow and creates appropriate backpressure to prevent bubble spiking in UV detectors

Detector Lamp Replacements

7885000	NGC LED Lamp Replacement , includes 255/280 nm LED lamp replacement for single-wavelength detectors
7885001	NGC Deuterium Lamp Replacement , includes lamp replacement (UV) for multi-wavelength detectors
7885002	NGC Tungsten Lamp Replacement , includes lamp replacement (Vis) for multi-wavelength detectors
7885056	NGC Replacement Conductivity Monitor , includes replacement conductivity monitor

pH Valve

7884011	NGC pH Valve Module , for accurate inline pH measurement; includes pH probe, tubing, and fittings
7885026	NGC pH Probe (Ag/AgCl) , for use with the pH valve for accurate pH monitoring (pH 0–14) during purifications
7885027	NGC Blank pH Probe , pH valve cap for use with the pH valve when the probe is removed

Mixer

7884018	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
7884019	NGC F100 Mixer , 750 µl base and top assembly, included with all 100 ml/min NGC systems
7884020	NGC F10 Mixer , 263 µl base and top assembly, included with all 10 ml/min NGC systems
7884021	NGC F10 Mixer Barrel Kit , 750 µl extension barrel for F10 263 µl mixer (part of Scout 10 and Discover 10 series)
7884022	NGC F10 Mixer Barrel Kit , 2 ml extension barrel for F10 263 µl mixer (optional)
7884028	NGC F100 Mixer Barrel Kit , 2 ml extension barrel for F100 750 µl mixer body, part of Scout 100, Discover 100 series
7884024	NGC F100 Mixer Barrel Kit , 12 ml extension barrel for F100 750 µl mixer (optional)
7884023	NGC F100 Mixer Barrel Kit , 5 ml extension barrel for F100 750 µl mixer (optional)

Valves

7884007	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; valve can also be used with dynalooops, sample pumps, and the C-96 autosampler
7884010	NGC Buffer Blending Valve Module , for online buffer preparation and generating pH gradients for quick pH scouting; kit includes the necessary tubing and fittings
7884006	NGC Inlet Valve Module , for automated switching between multiple buffers and samples during method development, kit includes the necessary tubing and fittings
7884012	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
7884026	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
7884013	NGC Outlet Valve Module , for collection of up to 12 large volume fractions, including necessary tubing and fittings

continues

Medium-Pressure Chromatography Systems

www.bio-rad.com/NGCaccessories

Ordering Information

Catalog #	Description
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Maintenance Kits

7885003	Pump Maintenance Kit , 10 ml, for regular maintenance of NGC F10 pumps, includes seals and check valves
7885004	Pump Maintenance Kit , 100 ml, for regular maintenance of NGC F100 pumps, includes seals and check valves
7885005	Pump Maintenance Kit, Sample pump , 100 ml, for regular maintenance of NGC sample pump, includes seals and check valves

Air Sensor

7885017	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
7885018	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)
7885020	NGC Air Sensor , small, includes air sensor; enables exclusion of air from system and columns. Detects air in small-diameter PEEK tubing
7885021	NGC Air Sensor , large, includes air sensor; enables exclusion of air from system and columns. Detects air in large-diameter PTFE tubing

Fraction Collector and Autosampler

7410002	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
7884025	NGC Communication Adaptor , enables communication between Bio-Rad devices such as the BioFrac fraction collector and the NGC system
7605011	C-96 Autosampler without Cooling , 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 #7605014, #7605026, and #7600604
7605010	C-96 Autosampler with Cooling , 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 #7605014, #7605026, and #7600604
7884016	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 (#7885013) and external detectors

NGC Accessories

7885038	NGC Column Holder , column holder for use with NGC systems, pkg of 1
7885039	NGC Cartridge Holder , universal cartridge holder, holds 1–10 ml cartridges
7885041	NGC Sample/Wash Tube Holder , holds two 50 ml Falcon tubes, for use with NGC systems (tubes not included)
7885042	NGC Tubing Retainers (small) , holds small PEEK tubing in an organized manner, pkg of 3 magnetic retainers
7885035	NGC Tubing Retainers (large) , holds larger PTFE tubing in an organized manner, pkg of 3 magnetic retainers
7885031	NGC Inline Filter Kit , includes buffer inline filter kit, filters particulates from buffer and prevents clogging of columns
7884017	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

7884000	NGC Expansion Bay , tier 3, expands base system to 3-tier system for use with additional modules
7884001	NGC Expansion Bay , tier 4, expands system to 4 tier system for use with additional modules
7885014	NGC Buffer Tray , holds up to 8 buffer bottles. Includes drain port to prevent flooding in the event of a leak
7885016	NGC Drip Tray , for use with NGC systems
7885040	NGC Touch Screen Stand , used to mount touch screen outside of coldbox or -room while tethered to the system, enables convenient system operation from the outside
7885060	Touch Screen Bracket , for use with standard third party monitor stands, used to mount touchscreen outside the cold box or room while tethered to system, includes cable
7884015	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
7884027	Monitor , 22", for use with NGC system computer
7880020IQOQ	NGC IQ/OQ, NGC Quest/Quest Plus IQ/OQ (with BioFrac and air sensor) , Installation Qualification and Operational Qualification (IQ/OQ) performed by Field Service Engineers on location at the customer's site, duration: 1 day
7880030IQOQ	NGC Scout/Discover/Discover Pro IQ/OQ (with BioFrac and air sensor) , Installation Qualification and Operational Qualification (IQ/OQ) performed by Field Service Engineers on location at the customer's site, duration: 2–3 days

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.

This interface is also fully configured with VNC (virtual network computing), allowing you to control and monitor the system remotely from nearly any smartphone, tablet, or laptop.

ChromLab software is available in standard format or as a security edition which provides the necessary features to permit users to operate in compliance with Title 21 of the US Code of Federal Regulations Part 11 (21 CFR part 11) within a closed system. It is compatible with Win 7, 8, and 8.1 OS.

New ChromLab™ Software

ChromLab 3.1 is available in standard format (free) as an upgrade for existing ChromLab software users. It contains enhancements to existing ChromLab features and a linear flow rate calculator.

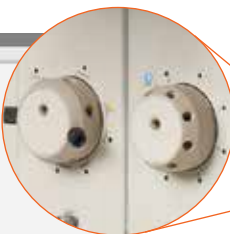
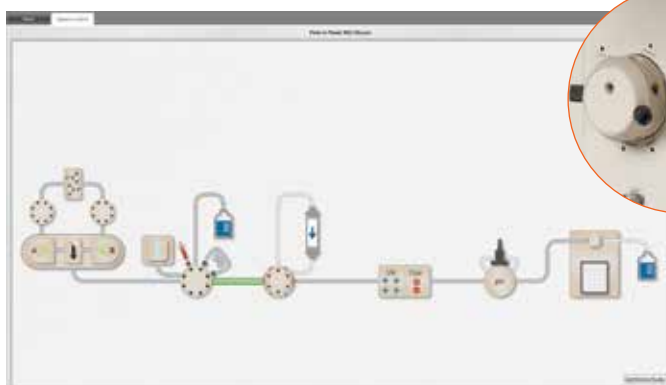
Graphical Instrument Setup and Control

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.

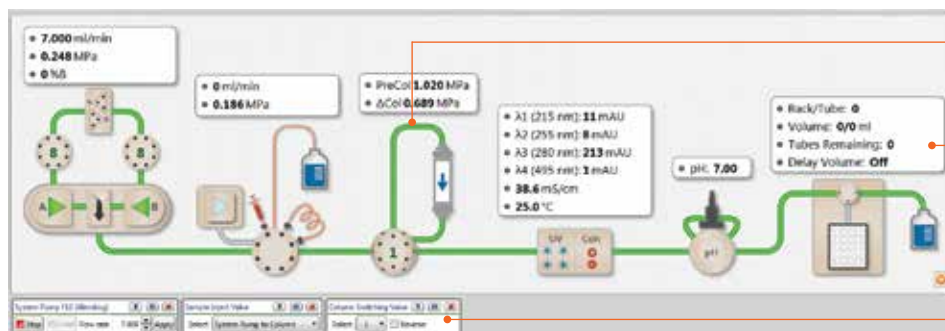
The instrument control interface is touch screen optimized, allowing flexibility without the need for a computer adjacent to the system, thus minimizing the total footprint.

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

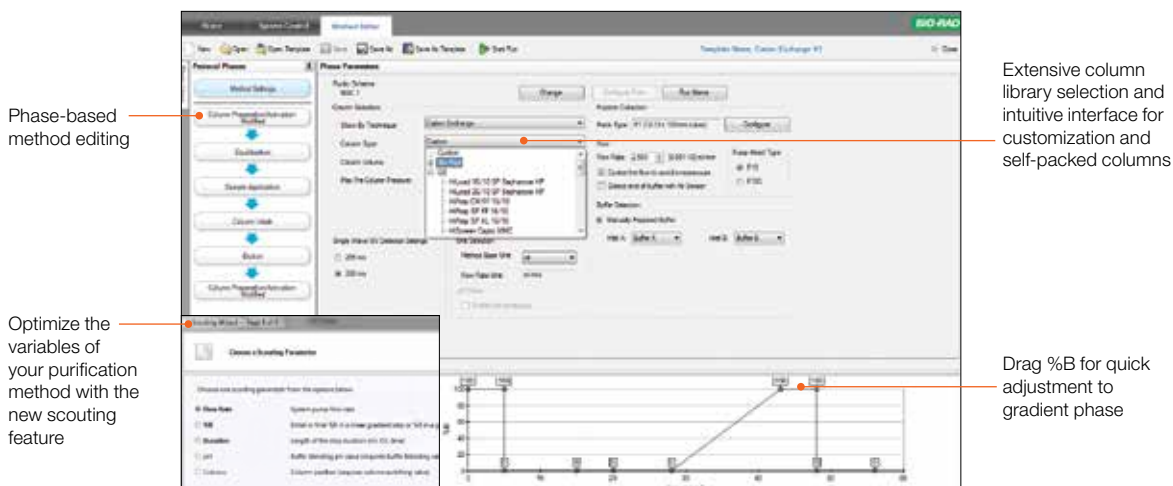
Graphical manual control panels allow complete, accessible manual control of the system

Complete system status and control is available via the graphical fluidics scheme.

Streamlined Method Development

ChromLab software includes templates for common chromatographic techniques and a column database 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 separation workflow instead of hardware controls. The interactive gradient graph enables visualization of the protocol and quick click-and-drag experimental adjustments.



Automated Tandem Purification Techniques

The software contains tandem purification templates that reflect common tandem purification scenarios. These templates may be edited to fit your research and reduce hands-on time.

Features and Benefits of ChromLab Software

- Touch screen allows the same level of flexibility without the need for a computer adjacent to the system, minimizing the total footprint for an operational system
- Customizable chromatogram layouts with a variety of viewing and data analysis options
- Rapid creation of trace comparisons for easy analysis across multiple purification runs
- Single-click peak detection and integration for quicker results
- Advanced integration parameters to enable manual integration functions and peak addition or removal for fine-tuning your data
- Intuitive, grouped data tabular layouts that organize data for easy navigation

Applications and Uses of ChromLab Software

- Controls all functions of the NGC medium-pressure chromatography system for lab-scale protein purification
- Instrument control
- Method development to identify best methods
- Real-time monitoring of proteins, peptides, nucleic acids, and chromophores
- Chromatogram comparison and peak analysis
- Advanced integration parameters enable manual integration functions and peak addition or removal for fine-tuning data
- Organized data and easy navigation with intuitive grouped table layouts

For More Information

Web: www.bio-rad.com/chromlab

Ordering Information

Catalog #	Description
7886000	ChromLab Software CD , single software platform compatible with all NGC systems, includes integrated system setup controls, method development, data acquisition, and analysis. Compatible with Win 7, 8, and 8.1 OS

Medium-Pressure Chromatography Systems

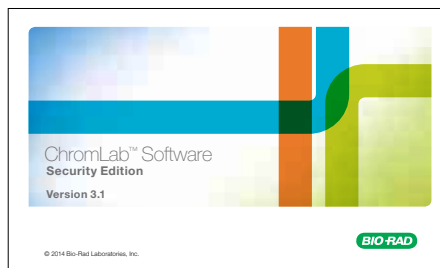
www.bio-rad.com/NGCaccessories

New ChromLab™ Software, Security Edition

ChromLab 3.1 (Security Edition) SE is available with one, three, or five licenses. When enabled, Security Edition provides the necessary features to permit users to operate in compliance with Title 21 of the U.S. Code of Federal Regulations Part 11 (21 CFR part 11) within a closed system.

ChromLab Security Edition software provides tools to:

- Limit and authorize system access to authorized users
- Limit access to selected tasks through user level permissions
- Produce computer generated audit trails
- Prevent falsification of data



- Generate binding signatures and records
- Create accurate and complete signed reports for FDA submissions

For More Information

Web: www.bio-rad.com/chromlab

Ordering Information

Catalog #	Description
7886001	ChromLab Security Edition (SE Software) CD , single software platform compatible with all NGC systems, includes integrated system setup controls, method development, data acquisition, and analysis. Security edition also provides features in accordance with 21 CFR part 11 requirements. 1 license
7886003	ChromLab Security Edition (SE Software) CD , single software platform compatible with all NGC systems, includes integrated system setup controls, method development, data acquisition, and analysis. Security edition also provides features in accordance with 21 CFR part 11 requirements. 3 licenses
7886005	ChromLab Security Edition (SE Software) CD , single software platform compatible with all NGC systems, includes integrated system setup controls, method development, data acquisition, and analysis. Security edition also provides features in accordance with 21 CFR part 11 requirements. 5 licenses

New ChromLab™ Software, IQ/OQ AND CFR PART 21 COMPLIANT

The NGC IQ/OQ is designed to evaluate the installation and operation of the instrument. This service is provided by our trained Field Service Engineers utilizing the Installation Qualification and Operational Qualification protocols we have developed. IQ/OQ should be performed at instrument installation as well as after the removal or addition of modules. IQ/OQ gives you confidence that your instrument is installed and operating to specifications.

Features and benefits of NGC installation and qualification and operational qualification:

- Ensure system performance
- Are performed by trained field service engineers
- Are performed at customer sites

For More Information

Web: www.bio-rad.com/NGCiqoq

Ordering Information

Catalog #	Description
7880020IQOQ	NGC Quest/Quest Plus IQ/OQ (with BioFrac and air sensor) , Installation Qualification and Operational Qualification (IQ/OQ) performed by Field Service Engineers on location at the customer's site, duration: 1 day
7880030IQOQ	NGC Scout/Discover/Discover Pro IQ/OQ (with BioFrac and air sensor) , Installation Qualification and Operational Qualification (IQ/OQ) performed by Field Service Engineers on location at the customer's site, duration: 2–3 days

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](http://www.bio-rad.com/tech/chrom)
Web: www.bio-rad.com/tech/chrom

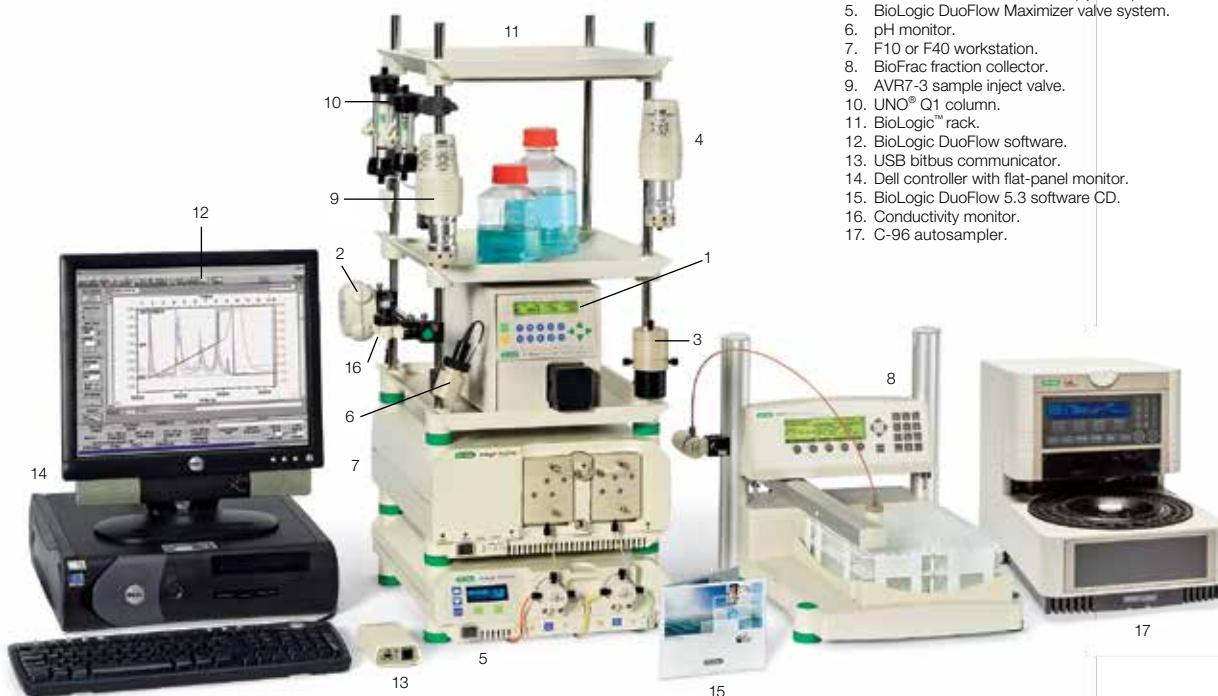
BioLogic DuoFlow Medium-Pressure Chromatography System Selection Guide

	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	•

Note: refer to page 150 for low-pressure chromatography systems and components; and see page 145 for chromatography accessories.

BioLogic DuoFlow Pathfinder™ system components:

1. BioLogic DuoFlow QuadTec™ UV/Vis detector.
2. SV5-4 select valve (optional).
3. BioLogic DuoFlow Maximizer™ mixer.
4. AVR9-8 stream-select valve (optional).
5. BioLogic DuoFlow 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.



Medium-Pressure Chromatography Systems

www.bio-rad.com/DFmediumpressure

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 previous 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 Options		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		134	134	143	147	136	135	136	136	136
	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	◦	•	◦	◦	◦	•	•	◦	◦

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

Ordering Information

Catalog # Description

BioLogic DuoFlow Systems*

7600037	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
7600036	BioLogic DuoFlow 10 System , 100/120 V, for Japan and Korea only, does not include monitor
7600038	BioLogic DuoFlow 10 System , 220/240 V, does not include monitor
7604037	BioLogic DuoFlow 40 System , 100/120 V, same as #7600037 with F40 workstation replacing F10 workstation
7604036	BioLogic DuoFlow 40 System , 100/120 V, for Japan and Korea only, does not include monitor
7604038	BioLogic DuoFlow 40 System , 220/240 V, does not include monitor
7600047	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
7600046	BioLogic DuoFlow 10 System with BioFrac Fraction Collector , 100/120 V, for Japan and Korea only, does not include monitor
7600048	BioLogic DuoFlow 10 System with BioFrac Fraction Collector , 220/240 V, does not include monitor
7604047	BioLogic DuoFlow 40 System with BioFrac Fraction Collector , 100/120 V, same as #7600047 with F40 workstation replacing F10 workstation
7604046	BioLogic DuoFlow 40 System with BioFrac Fraction Collector , 100/120 V, for Japan and Korea only, does not include monitor
7610001	BioLogic DuoFlow 10 Core with BioFrac Fraction Collector , 100/120 V
7610002	BioLogic DuoFlow 10 Core with BioFrac Fraction Collector , 220/240 V

* The 10 system includes an F10 workstation. The 40 system includes an F40 workstation.

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

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 pump head 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 pump head can be doubled with the addition of the BioLogic Maximizer™ valve system. The kits contain fully assembled pump heads with seals and check valves installed for fast, easy pump head 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	
7600150	BioLogic DuoFlow F10 Workstation
7600140	BioLogic DuoFlow F40 Workstation
Pump Kits	
7600110	F10 Pump Kit , converts F40 workstation to F10 pumps to enable flow rates as low as 0.01 ml/min; includes 2 fully assembled pump heads, 4 piston assemblies, F10 tubing kit, tools
7600180	F40 Pump Kit , expands pumping capabilities to 40 ml/min; includes 2 fully assembled pump heads, 4 piston assemblies, mixer barrel extender, 2 mm UV flow cell, F40 tubing kit, tools
Mixers	
7600170	MX-1 Mixer , includes mixer body (263 µl) and standard mixer barrel for total volume of 750 µl
7600171	Mixer Barrel Extender , for total volume of 2 ml; one included in the F40 pump kit (#7600180)
7602010	BioLogic Maximizer Mixer , includes 750 µl mixer body, 5 ml and 12 ml mixer barrel extenders, 5 O-rings, stirbar, installation screws
7602005	BioLogic Maximizer Mixer Barrel Extender , 5 ml
7602012	BioLogic Maximizer Mixer Barrel Extender , 12 ml
BioLogic DuoFlow Workstation Accessories	
7600164	F10 Pump Maintenance Kit , to service one F10 pump, includes 2 piston seals, 4 check valves, seal removal tool, 2 O-rings
7600161	F10 Piston Seals , 2, includes seal tool, to service one F10 pump
7600162	F10 Piston Kit , 2 pistons, to service one F10 pump
7600184	F40 Pump Maintenance Kit , to service one F40 pump, includes 2 piston seals, 4 check valves, seal removal tool, 2 O-rings
7600172	F40 Piston Seals , 2, includes seal tool, to service one F40 pump
7600173	F40 Piston Kit , 2 pistons, to service one F40 pump
7500162	Check Valve , 1 (4 required per pump)
7500703	Inline Filter Kit , includes 1 filter unit, 2 replacement frits
7500230	40 psi Backpressure Regulator
7600135	BioLogic System Starter Kit

BioLogic DuoFlow Workstations

Pump Kits

Mixers

BioLogic DuoFlow Workstation Accessories

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

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 μ l to yield high precision and accuracy



BioLogic DuoFlow pH Monitor

Medium-Pressure Chromatography Systems

www.bio-rad.com/DFmedpressurecomponents

Ordering Information

Catalog #	Description
7500200	BioLogic DuoFlow Detector Kit , includes UV optics module and conductivity monitor, 5 mm analytical flow cell
7500202	UV Optics Module , 5 mm analytical flow cell
7500240	Conductivity Monitor
7500210	Flow Cell , preparative, 2 mm (30 ml) pathlength
7500212	Flow Cell , analytical, 5 mm (16 ml) pathlength
7500216	Mercury Lamp , for use at all wavelengths except 214 nm
7500220	Detector Filters , 254 and 280 nm
7500223	Detector Filter , 365 nm
7500224	Detector Filter , 405 nm
7500225	Detector Filter , 436 nm
7500214	214 nm Conversion Kit , for detectors with serial #362BRXXXX, includes zinc lamp, housing, and 214 nm filter for peptide detection
7500217	Zinc Lamp , for 214 nm detection
7500221	Detector Filter , 214 nm, requires zinc lamp
7601300	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
7601330	Deuterium Lamp , replacement
7601332	Halogen Lamp , replacement
7601331	Halogen Lamp , with holder for first-time halogen lamp change
7601306	Standard Flow Cell , 3 mm pathlength (2 µl)
7601406	High-Speed Flow Cell , 2 mm pathlength, flow rate to 80 ml/min with fittings
7601311	Long Fingertight Fittings , 10-32 x 1.03", 4
7601320	Instrument Control Module (ICM) Kit , includes ICM power cable and cable 17
7500650	System Cable 17 , bus communication cable, 1.2 m (4')
7601307	System Cable 25 (BioLogic QuadTec RS-232) , connects BioLogic QuadTec detector to ICM
7601321	System Cable 26 (ICM Power) , connects to 12 V power on BioLogic DuoFlow workstation
7500230	40 psi Backpressure Regulator

BioLogic DuoFlow pH Monitor

7602040	BioLogic DuoFlow pH Monitor , includes SIM module, pH electrode, flow cell, and tubing
7602042	pH Electrode
7602044	Flow Cell
7602046	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)

7500502	Signal Import Module , includes 4' communication cable (system cable 17)
7602034	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

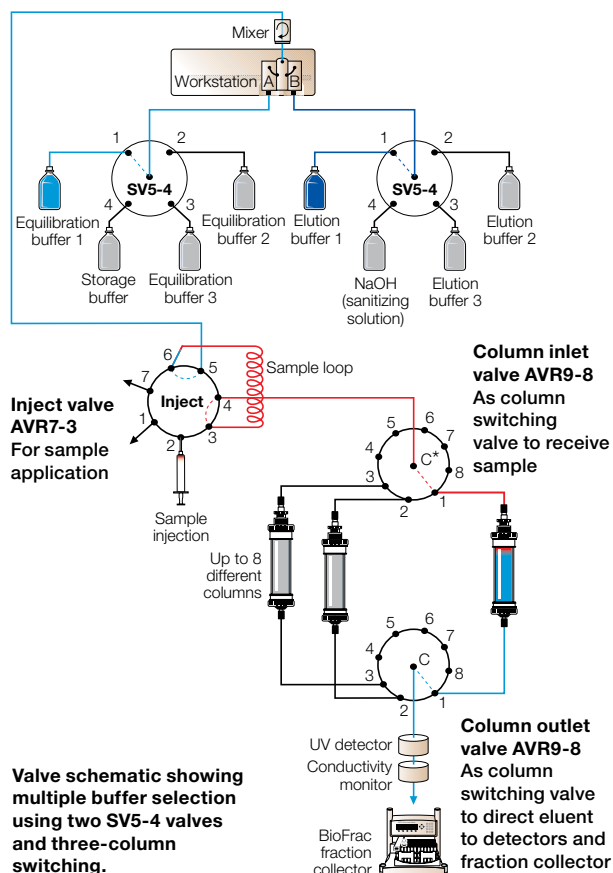
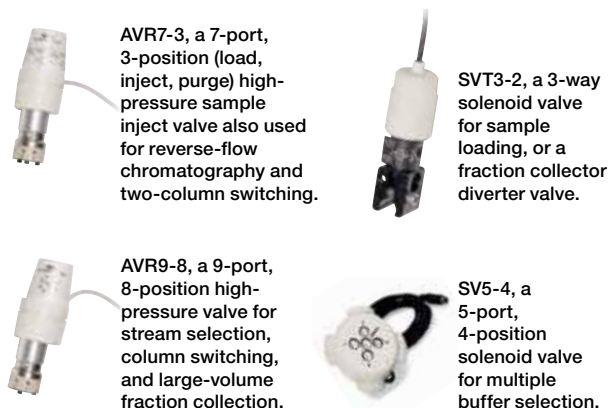
- Multiple buffer selection
- 8-column switching
- Large-volume fraction collection
- Tandem chromatography

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

Medium-Pressure Chromatography Systems

www.bio-rad.com/DFmedpressurecomponents

Ordering Information

Catalog #	Description
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BioLogic DuoFlow Valves and Rebuild Kits

7600406	AVR7-3 Automated Sample Injection Valve , 7-port, 3-position high-pressure valve, 3,500 psi (233 bar) limit
7600401	AVR7-3 Valve Rebuild Kit
7600408	AVR9-8 Stream-Select Valve , 9-port, 8-position high-pressure valve, 3,500 psi (233 bar) limit
7600403	AVR9-8 Valve Rebuild Kit
7600410	SVT3-2 Diverter Valve , 3-port, 2-position solenoid valve, 30 psi (2 bar) limit
7600411	SVT3-2 Valve Rebuild Kit
7500415	SV5-4 Select Valve , 5-port, 4-position solenoid valve, 30 psi (2 bar) limit

BioLogic DuoFlow Fittings Kit

7600550	BioLogic DuoFlow Fittings Kit
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BioLogic Single-Injection Sample Loops, Kits, and Accessories

7500471	Sample Injection Port , for use with AVR7-3 automated sample injection valve
1250224	Injection Needle , 22 gauge, blunt
7500490	Small-Volume Sample Loop Kit , includes 100, 250, and 500 µl PEEK loops
7500491	Large-Volume Sample Loop Kit , includes 1, 2, and 5 ml PEEK loops
7500482	25 µl Tefzel Sample Loop
7500483	50 µl Tefzel Sample Loop

BioLogic Single-Injection Sample Loops, Kits, and Accessories

7500492	100 µl PEEK Sample Loop
7500493	250 µl PEEK Sample Loop
7500494	500 µl PEEK Sample Loop
7500495	1 ml PEEK Sample Loop
7500496	2 ml PEEK Sample Loop
7500497	5 ml PEEK Sample Loop

BioLogic Dynamic (Sliding Piston) Sample Loops, Kits, and Seal Replacement

7500451	DynaLoop 25 Kit , includes 25 ml DynaLoop sliding piston loop, DynaLoop parts kit
7500452	DynaLoop 90 Kit , includes 90 ml DynaLoop sliding piston loop, DynaLoop parts kit
7500450	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
7500475	DynaLoop 25 Sample Loop , 25 ml, replacement
7500476	DynaLoop 90 Sample Loop , 90 ml, replacement
7500455	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

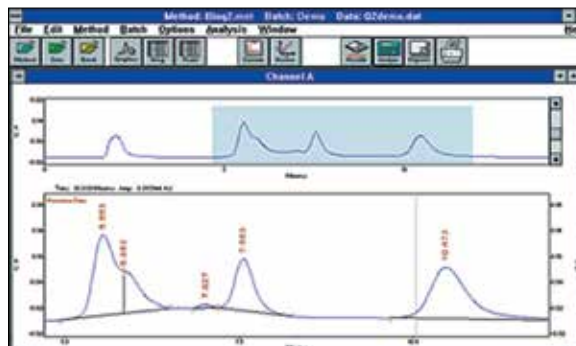
Catalog #	Description
7602050	BioLogic DuoFlow Software Version 5.3 Upgrade , upgrades existing BioLogic DuoFlow version 5.0 systems, includes version 5.3 software CD

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
7500111	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
7500251	BioLogic Rack , includes rack tray, 8 sleeves, 2 short vertical bars, 2 long vertical bars, column clamp set, 5 bar clamps, 4 cable organizers
7500268	BioLogic Rack Expansion Kit , includes 2 rack trays, 2 long vertical bars, 16 sleeves

Accessories

7500261	BioLogic Rack Tray , includes 1 rack tray, 8 bar sleeves
7500262	Vertical Bars , long, 64 cm, 2
7500263	Vertical Bars , short, 10 cm, 2
7500264	Horizontal Bar Kit , includes 2 tie bars, 4 bar clamps
7500260	Column Clamp Set , includes 1 column clamp assembly
7500265	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
7605010	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 #7605014, #7605026, and #7600604
7605011	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 #7605014, #7605026, and #7600604
7605012	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
7605013	Syringe , pkg of 1, 1 ml syringe, for use with C-96 autosamplers
7605014	Connector Kit , contains nuts and ferrules to plumb the syringe valve, for use with C-96 autosamplers
7605024	Sample Tray , pkg of 1, large-capacity 96-position tray for 1.5 ml vials (12 mm OD), for use with C-96 autosamplers
7600604	PEEK Tubing , pkg of 1, 1/16" OD x 0.020" ID x 30' high-pressure tubing, rated to 5,000 psi, orange
7605026	Fittings Kit , contains 10-32 short nuts and ferrules to plumb the injection valve, for use with C-96 autosamplers
7605027	Needle , pkg of 1, 45 µl needle, for use with C-96 autosamplers
7605028	Prep Kit Needle , pkg of 1, needle for large sample volume, for use with C-96 autosamplers
7605017	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
7885011	NGC Autosampler , includes NGC SIM and connector cable
7885012	NGC Autosampler with Cooling , includes NGC SIM and connector cable

For NGC system-compatible products, see page 127 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
7318122	Model 2110 Fraction Collector , 100/120 V
7318120	Model 2110 Fraction Collector , 220/240 V
Accessories	
7318130	Carousel , 80-tube capacity
7318135	Micro Tube Adaptor , 80 microtube capacity
7318136	Instrument Dust Cover
7318131	Replacement Drop Formers , 2
7318261*	System Cable 1 , 8-pin mini-DIN to DB-9 connector
7318265*	System Cable 5 , DB-9 connector to bare wires
7319010*	System Cable 22 , Y-cable connecting Econo gradient pump to Model 2110 fraction collector
Tubes	
2239750	Clear Polystyrene Tubes , 13 x 100 mm, 9 ml nominal capacity, 1,000
2239751	Natural Polypropylene Tubes , 13 x 100 mm, 9 ml nominal capacity, 1,000
2239500	Micro Test Tubes , capless, 1.5 ml, polypropylene, natural, graduated, 500

* For more information, refer to the Cable Guide on page 145.

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

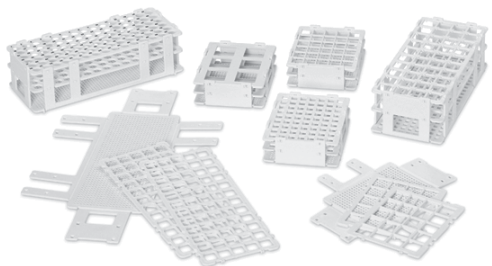
Optional Components

- 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



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 μ l 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.



Medium-Pressure Chromatography Systems

Fraction Collectors

www.bio-rad.com/fractioncollectors

Ordering Information

Catalog #	Description
7410002	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	
7410010	Rack Set F1 , 2 x flatpack, with numbered tube positions, each holds 90 tubes, 12–13 mm diameter
7410011	Rack Set F2 , 2 x flatpack, each holds 60 tubes, 15–16 mm diameter, for total of up to 120-tube collection
7410012	Rack Set F3 , 2 x flatpack, each holds 40 tubes, 18–20 mm diameter, for total of up to 80-tube collection
7410013	Rack Set H1 , 4 x flatpack, each holds 42 capless 1.5 ml Eppendorf/microtubes for total of up to 168-microtube collection
7410014	Rack Set H2 , 4 x flatpack, each holds 63 capless 0.5 ml Eppendorf/microtubes for total of up to 252-microtube collection
7410015	Rack Set H3 , 4 x flatpack, each holds 30 reduced-volume scintillation vials, 16 mm diameter, for total of up to 120-vial collection
7410016	Rack Set H4 , 4 x flatpack, each holds 6 scintillation vials, 30 mm diameter, for total of up to 24-vial collection
7410020	BioFrac H4-High Rack Set , 4 x flatpack, each holds 6 centrifuge tubes, 30 mm diameter, for total of up to 24-vial collection
7410017	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; Titer tube microtube collection, 8 x 12, 96-tube configuration
7410018	BioFrac Prep-20 Preparative Rack , for fractionation into 1–20 collection vessels of any size
7410007	BioFrac Fraction Collector Fittings Kit , includes replacement fittings and tubing for setup of the fraction collector to the BioLogic LP or BioLogic DuoFlow chromatography system
7410088	BioFrac Microplate Drophead Kit , includes preassembled drophead nut with 0.020" ID Tefzel tubing; delivers approximately 25 µl per drop
7318263*	System Cable 3 , 8-pin mini-DIN to 8-pin mini-DIN
7318286*	System Cable 15 , 15-pin D to mini-DIN
7318287*	System Cable 16 , 8-pin mini-DIN to 8-pin standard DIN
7318290	BioFrac Accessory Cable , 15-pin D to bare wires, for connecting BioFrac fraction collector to other equipment; for input or output signals
7319009*	System Cable 23 , Y-cable connecting Econo gradient pump to BioFrac fraction collector

Tubes

2239750	Clear Polystyrene Tubes , 13 x 100 mm, 9 ml nominal capacity, 1,000
2239751	Natural Polypropylene Tubes , 13 x 100 mm, 9 ml nominal capacity, 1,000
2239500	Micro Test Tubes , capless, 1.5 ml, polypropylene, natural, graduated, 500

* For more information, refer to the Cable Guide on page 145.

For NGC compatible products, see page 127 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 From	Connection to										
	BioLogic DuoFlow™ Workstation	BioLogic™ LP System	BioLogic DuoFlow Controller	BioLogic QuadTec™ UV/Vis Detector	Non-BioLogic System Compromise	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
7318261	System Cable 1 , 8-pin mini-DIN to DB-9 connector
7318262	System Cable 2 , 8-pin mini-DIN to 8-pin standard DIN
7318263	System Cable 3 , 8-pin mini-DIN to 8-pin mini-DIN
7318264	System Cable 4 , 8-pin mini-DIN to banana plug cable
7318265	System Cable 5 , DB-9 connector to bare wires
7318266	System Cable 6 , 8-pin standard DIN to bare wires
7318267	System Cable 7 , 8-pin mini-DIN to bare wires
7318268	System Cable 8 , 8-pin standard DIN to DB-9 connector
7318269	System Cable 9 , 8-pin mini-DIN to GE Healthcare FRAC-100
7318285	System Cable 14 , 8-pin mini-DIN to Gilson connector
7318286	System Cable 15 , 15-pin D to mini-DIN
7318287	System Cable 16 , 8-pin mini-DIN to 8-pin standard DIN
7500650	System Cable 17 , bus communication cable, 1.2 m (4')
7500651	System Cable 18 , bus communication cable, 3.7 m (12')

continues

Ordering Information

Catalog #	Description
7500652	System Cable 19 , bus communication cable, 9.2 m (30')
7500655	System Cable 21 , BioLogic HR system communication cable, 30 m (100')
7319010	System Cable 22 , Y-cable for connecting Econo gradient pump to Model 2110 fraction collector
7319009	System Cable 23 , Y-cable for connecting Econo gradient pump to BioFrac fraction collector
7601307	System Cable 25 (BioLogic QuadTec RS-232) , connects BioLogic QuadTec to ICM
7601321	System Cable 26 (ICM Power) , connects to 12 V power on BioLogic DuoFlow workstation
7602004	System Cable 30 , bus communication cable, 0.3 m (1')
7602032	System Cable 31 , USB cable
7318290	BioFrac Accessory Cable , 15-pin D to bare wires, for connecting BioFrac fraction collector
7885013	NGC Autosampler Cables , for connection with the NGC SIM

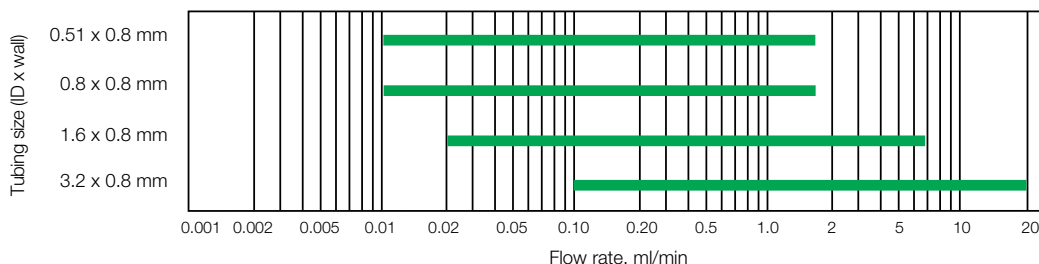
Low-Pressure Tubing

- **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 pump heads 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	
7318210	Silicone Tubing , 0.8 mm ID/0.8 mm wall, 10 m
7318211	Silicone Tubing , 1.6 mm ID/0.8 mm wall, 10 m
7318212	Silicone Tubing , 3.2 mm ID/0.8 mm wall, 10 m
Tygon Tubing	
7318213	Tygon Tubing , 0.51 mm ID/0.8 mm wall, 10 m
7318214	Tygon Tubing , 0.8 mm ID/0.8 mm wall, 10 m
7318215	Tygon Tubing , 1.6 mm ID/0.8 mm wall, 10 m
PharMed Tubing	
7318207	PharMed Tubing , 0.8 mm ID/1.0 mm wall, 10 m
7318208	PharMed Tubing , 1.6 mm ID/1.0 mm wall, 10 m
7318209	PharMed Tubing , 3.2 mm ID/1.0 mm wall, 10 m
Pump Tubing Kits	
7318240	Pump Tubing Kit , 0.8 mm ID silicone, 20 precut lengths and 4 sets of fittings, for use with EP-1 Econo pump
7318241	Pump Tubing Kit , 1.6 mm ID silicone, 20 precut lengths and 4 sets of fittings, for use with EP-1 Econo pump
7318242	Pump Tubing Kit , 3.2 mm ID silicone, 20 precut lengths and 4 sets of fittings, for use with EP-1 Econo pump
7318247	Pump Tubing Kit , 0.8 mm ID PharMed, 20 precut lengths and 4 sets of fittings
7318248	Pump Tubing Kit , 1.6 mm ID PharMed, 20 precut lengths and 4 sets of fittings
7318249	Pump Tubing Kit , 3.2 mm ID PharMed, 20 precut lengths and 4 sets of fittings
7319007	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

Silicone Tubing**Tygon Tubing****PharMed Tubing****Pump Tubing Kits****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
7500603	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 pump heads
7500602	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
7600604	PEEK Tubing , orange, 1/16" OD x 0.020" ID x 30', rated to 5,000 psi
7600605	PEEK Tubing , green, 1/16" OD x 0.030" ID x 30', rated to 3,000 psi
7600650	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
7600652	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
7602046	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
7602002	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
7602003	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			
7600550		BioLogic System Fittings Kit , includes PEEK and Tefzel nuts, ferrules, unions, plugs, and luer syringe	1
Individual Medium- and High-Pressure Fittings			
7885015		PEEK Nut , 1/8", 10	10
7885007		10-32 PEEK Union , 1/16", 0.020	1
7885008		Fittings Tightener , (short)	1
7885010		Adaptor , FEM Slip Luer-FEM 10-32 + Adap, Quick Con, M Luer-FEM 10-32	1
7320113		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
7500556		Ferrule and Lock Ring , for 1/16" OD (1.6 mm) tubing	10
7500559		Tefzel Cap , 1/4–28 female connection, to plug unused tubing	5
7500560		BioLogic Fittings Tool	1
7500561		Tefzel Union Adaptor , 1/4–28 to M6, to connect 1 M6 column to a BioLogic DuoFlow system	2
7500562		Tefzel Union , 1/4–28 to 1/4–28 to extend tubing	5
7500563		Tefzel Plug , 1/4–28 male connection, to plug unused ports on valves and columns	5
7500564		HPLC Column to BioLogic System Adaptors , 2 fittings to connect 1 HPLC column (10-32) to a BioLogic DuoFlow system	2
7500565		Econo-Column to BioLogic System Fittings Kit , 2 fittings to connect 1 Econo-Column (luer) column to a BioLogic DuoFlow system	1 set
7500566		Bottle Cap Kit , includes 2 bottle caps, 2 plugs	1 set
7500567		UNO M6 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system	1 set
7500568		UNO 10-32 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system	1 set
7500569		Delrin Nut , for 1/16" OD (1.6 mm) tubing	10
7500570		Delrin Nut , for 1/8" OD (3.2 mm) tubing	5
7500571		Ferrule and Lock Ring , for 1/8" OD (3.2 mm) tubing	5
7500703		Inline Filter Kit , includes 1 inline filter and 2 replacement frits	1
7500704		Replacement Frits , for inline filter kit	5
7500553		1/8" OD (3.2 mm) Pre-Pump Fittings , includes Delrin nut, ferrules, lock ring	5
7500554		1/16" OD (1.6 mm) Post-Pump Fittings , includes Delrin nut, ferrules, lock ring	10
7601308		Long Fingertight Fittings , 10-32 x 0.82", for PEEK and Tefzel tubing	4
7601311		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			
Medium- and High-Pressure Fittings Kit				
7318220	Low-Pressure System Fittings Kit , polycarbonate/polypropylene, 250 pieces			
7319006	Econo Gradient Pump Fittings Kit , includes 32 fittings, 12 tubing retainers			
Catalog #	Diagram	Description	Quantity	Material
Individual Low-Pressure Fittings				
7318221*		0.8 mm Barb to Female Luer	25	Polypropylene
7318222*		1.6 mm Barb to Female Luer	25	Polypropylene
7318223*		3.2 mm Barb to Female Luer	25	Polypropylene
7318224		0.8 mm Barb to Male Luer	25	Polypropylene
7318225		1.6 mm Barb to Male Luer	25	Polypropylene
7318226		3.2 mm Barb to Male Luer	25	Polypropylene
7318228		Female Luer to Female Luer	10	Polypropylene
7318230		Male Luer to Male Luer	10	Polypropylene
7318232		Female Luer Plug	25	Polypropylene
7318233		Male Luer Plug	25	Polypropylene
7318229		Female Luer T-Connector	10	Polypropylene
7328302		0.8 mm Barb T-Connector , recommended for minimal dead-volume connection	25	Polypropylene
7328300		0.8 mm Barb to Barb Connector , recommended for minimal dead-volume connection	25	Polypropylene
7328103		3-Way Stopcock , 2 female luer to male luer	10	Polycarbonate/ polypropylene
7328107		3-Way Stopcock , nylon, solvent resistant	10	Nylon/polypropylene
7328102		2-Way Stopcock , female luer to male luer	10	Polycarbonate/ polypropylene
7323245		Luer Tubing Adaptor , with 5' of 0.8 mm ID PTFE tubing	5	Polypropylene/PTFE
7328202		Double Luer Tubing Adaptor , with 5' of 0.8 mm ID PTFE tubing	1	Polypropylene/PTFE
7320111		Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to an FPLC system	1	PEEK/Tefzel
7320112		Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system	1	Polypropylene/PTFE
7320113		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 the BioLogic low pressure system 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
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 MV-6 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 MV-6 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 chromatography resins, GE Healthcare HiTrap cartridges, SOURCE resins, and all other low-pressure chromatography resins

- **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 142), or collect into virtually any size container, from microplates to carboys, using the BioFrac™ fraction collector (page 143); 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
7318300	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, column and conductivity cell holder, starter kit
7318301	Standard BioLogic LP System , 220/240 V, includes same as #7318300
7318302	BioLogic LP System with Model 2110 Fraction Collector , 110/120 V, includes standard BioLogic LP system, SV-3 diverter/bypass valve, system cable 1
7318303	BioLogic LP System with Model 2110 Fraction Collector , 220/240 V
7318304	BioLogic LP System with BioFrac Fraction Collector , 110/120 V, includes standard BioLogic LP system, system cables 3 and 15
7318305	BioLogic LP System with BioFrac Fraction Collector , 220/240 V
7318336	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
7318337	BioLogic LP System with Model 2110 Fraction Collector and LP Data View Software , 220/240 V
7318338	BioLogic LP System with BioFrac Fraction Collector and LP Data View Software , 110/120 V, includes system cables 3 and 15, 25' serial cable
7318339	BioLogic LP System with BioFrac Fraction Collector and LP Data View Software , 220/240 V

Pump Tubing Kits

7318320*	MV-6 Manual Inject Valve , 6 ports
7318321*	SV-5 Buffer Select Valve , 5-port, 4-position solenoid random-access valve, 30 psi (2 bar) limit
7318322*	SV-3 Diverter/Bypass Valve , 3-way valve
7318323	Gradient Mixer
7318324	BioLogic LP Optics Module
7318165	UV Flow Cell , replacement
7318166	Lamp , replacement
7318167	Filter Assembly , 254 and 280 nm
7318155	Conductivity Flow Cell
7318350	BioLogic LP Starter Kit , includes buffers, standard, anion exchange cartridge

* For more information, see page 150.

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
7318365	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
7318321	SV-5 Buffer Select Valve, 5-port, 4-position solenoid random-access valve, 30 psi (2 bar) limit
7318320	MV-6 Manual Inject Valve, 6 ports
7318322	SV-3 Diverter/Bypass Valve, 3-way valve

Econo™ Gradient Pump

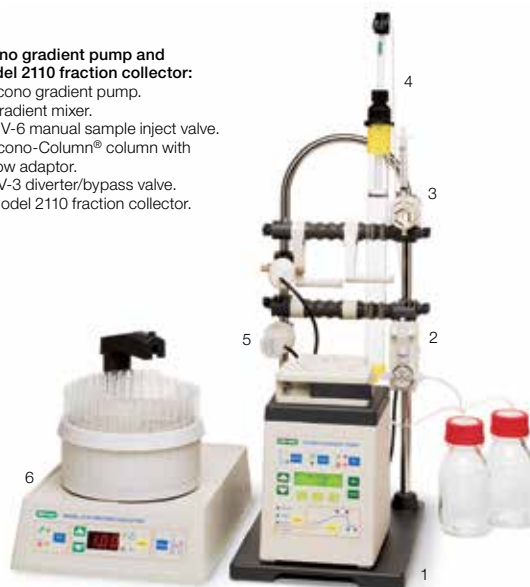
The Econo gradient pump is suited for any low-pressure protein purification application. It is the only stand-alone peristaltic pump capable of both isocratic and gradient elution. The Econo gradient pump works seamlessly with other Bio-Rad instruments such as the Model 2110 and BioFrac™ fraction collectors, 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

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.



For More Information

Web: www.bio-rad.com/econogradient

Request or download bulletin: 2438

Ordering Information

Catalog #	Description
7319001	Econo Gradient Pump , 100/120 V, includes tubing and fittings kits
7319002	Econo Gradient Pump , 220/240 V

Combination Systems

7319030	Econo Gradient Pump Combo 1 , 100/120 V, includes Econo gradient pump, gradient mixer valve
7319032	Econo Gradient Pump Combo 1 , 220/240 V
7319034	Econo Gradient Pump Combo 2 , 100/120 V, includes Econo gradient pump, gradient mixer valve, MV-6 manual inject valve, rack with column clamps
7319036	Econo Gradient Pump Combo 2 , 220/240 V
7319038	Econo Gradient Pump Combo 3 , 100/120 V, includes Econo gradient pump, gradient mixer valve, rack with column clamps
7319040	Econo Gradient Pump Combo 3 , 220/240 V

Valves

7318322	SV-3 Diverter/Bypass Valve , 3-way valve
7318323	Gradient Mixer
7318320	MV-6 Manual Inject Valve , 6 ports

Cables*

7319009	System Cable 23 , Y-cable for connecting Econo gradient pump to BioFrac fraction collector
7319010	System Cable 22 , Y-cable for connecting Econo gradient pump to Model 2110 fraction collector

Accessories

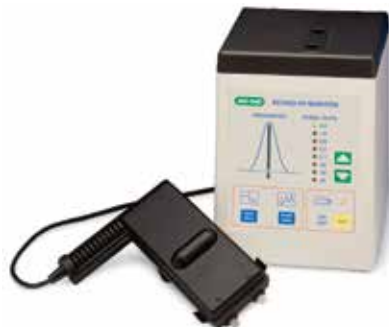
7319004	Econo Gradient Pump Rack , preassembled
7319006	Econo Gradient Pump Fittings Kit , includes 32 fittings, 12 tubing retainers
7319007	Econo Gradient Pump Tubing Kit , includes 2 each of 0.8, 1.6, and 3.2 mm PharMed tubing

* For more information, refer to the Cable Guide on page 145.

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	1.0×10^{-4} OD max. peak-to-peak (dry cell); 2.0×10^{-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	Safety	Meets IEC 61010 and CSA 22.2 certification
Detection limit	7 µg/ml (BSA in H ₂ O)	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
Lamp	Low-pressure mercury with phosphor screen		
Filters	254 and 280 nm		
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
7318160	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
7318162	Model EM-1 Econo UV Monitor , 220/240 V

Accessories

7318165	UV Flow Cell , replacement
7318166	Lamp , replacement
7318167	Filter Assembly , 254 and 280 nm

Process-Scale Separations

Bio-Rad has extensive experience serving the separation technology community with process resins that offer optimal solutions for your separation needs. To order Bio-Rad process-scale resins, contact your local Bio-Rad sales representative.

Process Resin Selection Guide

Resin	Available in Process-Scale Page #	Foresight™ Prepacked Columns and Plates Page #	Bottled Resins Sampling Kit Page #	Other Prepacked Columns Page #
Affinity				
Profinity™ IMAC	82			101
UNOsphere SUPrA™ rProtein A	88	104	98	101
Affi-Prep® protein A	89			101
Affi-Gel® 10/15	93			
Affi-Gel Blue	90			101
DEAE Affi-Gel Blue	90			101
CM Affi-Gel Blue	91			
Affi-Prep polymyxin	92			
Affi-Gel boronate	91			
Affi-Gel HZ	94			
Affi-Gel 102	94			
Analytical Grade Resins				
AG® 1, 4	71			
AG 50W	71			
AG 501	71			
Chelex®	71			
Hydrophobic Interaction				
Macro-Prep® methyl HIC	97			
Macro-Prep t-butyl HIC	97			
Ion Exchange				
Nuvia™ Q	67	104		
Nuvia S	67	104		
Nuvia HR-S	67	104		
UNOsphere™ Q	67	104	98	101
UNOsphere S, Rapid S	67	104	98	101
Macro-Prep High Q	69		98	101
Macro-Prep 25 Q	69			
Macro-Prep DEAE	69		98	101
Macro-Prep High S	69		98	101
Macro-Prep 25 S	69			
Macro-Prep CM	69			
Mixed-Mode				
Nuvia™ cPrime™	75	105	75	102
CHT™ Type I	76	105	98	106
CHT Type II	76	105	98	106
MPC™	77	105		
Bio-Gel® HT/HTP	79			
CFT™ Type II	78		98	106
Size Exclusion				
Bio-Gel P	95			106
Bio-Gel A	96			
Bio-Beads™ S-X	96			

For product applications and descriptions, please refer to the chromatography resin selection guide on page 65.

Process-Scale Chromatography Resin

Nuvia™ resins — a family of next generation ion-exchange products built on an industry proven rigid polymer base matrix. Nuvia Q and S resins offer superior flow properties and low nonspecific binding while delivering high capacity and unique selectivity. Nuvia HR-S is a high-resolution cation exchanger capable of separating very challenging high molecular weight impurities. Nuvia resins bring together a unique set of properties specifically designed to meet the demands of current and future downstream processes. Nuvia resins are flexible and robust with a large operational window, making them effective in capture and/or polish steps.

For More Information

Web: www.bio-rad.com/nuvia

Request or download bulletins: 5984, 5987, 6128, and 6129

UNOsphere™ resins — specialized for fast mass transfer, UNOsphere resins deliver high binding capacity at high flow rates while maintaining low backpressure. These robust polymeric resins 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 feed stream at any stage of the downstream process.

For More Information

Web: www.bio-rad.com/processIEX

Macro-Prep® resins — polymeric methacrylate resins are available with strong or weak ion exchange functionalities. These rigid macroporous hydrophilic resins provide excellent dynamic binding capacity, resolution, and throughput at high flow rates for the purification of biomolecules. Macro-Prep resins 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 resin — CHT is a robust mixed-mode resin 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

MPC™ resin — The newest addition to Bio-Rad's line of ceramic apatite chromatography resins is MPC ceramic hydroxyfluoroapatite (MPC). MPC is a fluorinated derivative of ceramic hydroxyapatite providing the same robust impurity clearance as CHT Type I, 40 µm. Use MPC to maximize your process economics for specialty protein purification applications. Contact your local Bio-Rad representative for additional information.

For More Information

Web: www.bio-rad.com/MPC

Nuvia™ cPrime™ resins — these resins 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 resins have 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 resin — this chemically pure form of fluoroapatite is a rigid, spherical, and macroporous resin 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® resin — AG resins are a highly referenced and extensively used line of chromatography resins 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

www.bio-rad.com/process

Chelex® resin — 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 resin — nonpolar polystyrene-based resin 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 resin is reusable and can be easily cleaned with alcohol solutions followed by a distilled water rinse.

For More Information

Web: www.bio-rad.com/processHIC

Foresight™ Prepacked Plates and Columns

Foresight plates and columns are prepacked with a range of Bio-Rad's process chromatography resins, 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 method development to scale-up optimization.

- Prepacked and ready-to-use formats are 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 resin modes designed for large-scale bioprocess
- Compatible with robotic liquid handling workstations

For More Information

Web: www.bio-rad.com/foresight



Chromatography Resins Available in Foresight Formats

Chromatography Resin	Mode
UNOsphere™ Q	Strong anion
UNOsphere S	Strong cation
UNOsphere Rapid S	Strong cation
UNOsphere SUPrA	rProtein A
Nuvia™ Q	Strong anion
Nuvia S	Strong cation
Nuvia™ cPrime™	Mixed-mode hydrophobic: cationic
Nuvia HR-S	Strong cation
MPC™ Type I — 40 µm particle size	Mixed-mode metal affinity: 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, 2 x 96-Well

7324714	Foresight UNOsphere Q, 20 µl
7324710	Foresight UNOsphere S, 20 µl
7324712	Foresight UNOsphere Rapid S, 20 µl
7324709	Foresight UNOsphere SUPrA, 20 µl
7324703	Foresight Nuvia Q, 20 µl
7324701	Foresight Nuvia S, 20 µl
7324707	Foresight Nuvia HR-S, 20 µl
7324705	Foresight Nuvia cPrime, 20 µl
7324716	Foresight CHT Type I, 40 µm, 20 µl
7324718	Foresight CHT Type II, 40 µm, 20 µl
7324785	Foresight MPC Type I, 40 µm, 20 µl

continues

Ordering Information

Description	1 ml	5 ml
Foresight Columns		
Foresight UNOsphere Q	7324732	7324752
Foresight UNOsphere S	7324730	7324750
Foresight UNOsphere Rapid S	7324731	7324751
Foresight UNOsphere SUPrA	7324729	7324749
Foresight Nuvia Q	7324721	7324741
Foresight Nuvia S	7324720	7324740
Foresight Nuvia HR-S	7324723	7324743
Foresight Nuvia cPrime	7324722	7324742
Foresight CHT Type I, 40 µm	7324735	7324755
Foresight CHT Type II, 40 µm	7324736	7324756
Foresight MPC Type I, 40 µm	7324737	7324757
Foresight RoboColumn Units, 1 row of 8 columns		
Foresight UNOsphere Q RoboColumn Unit	7324819	7324820
Foresight UNOsphere S RoboColumn Unit	7324813	7324814
Foresight UNOsphere Rapid S RoboColumn Unit	7324816	7324817
Foresight UNOsphere SUPrA RoboColumn Unit	7324834	7324835
Foresight Nuvia Q RoboColumn Unit	7324804	7324805
Foresight Nuvia S RoboColumn Unit	7324801	7324802
Foresight Nuvia HR-S RoboColumn Unit	7324831	7324832
Foresight Nuvia cPrime RoboColumn Unit	7324807	7324808
Foresight CHT Type I, 40 µm RoboColumn Unit	7324822	7324823
Foresight CHT Type II, 40 µm RoboColumn Unit	7324825	7324826
Foresight MPC Type I, 40 µm RoboColumn Unit	7324828	7324829
<p>* Package size: 2 x 96-well plates.</p> <p>** Package size: 1 row of 8 columns.</p> <p>*** Foresight RoboColumn units are to be used with robotic liquid handling workstations.</p> <p>For more information on prepacked columns and plates please visit www.bio-rad.com/foresight.</p>		

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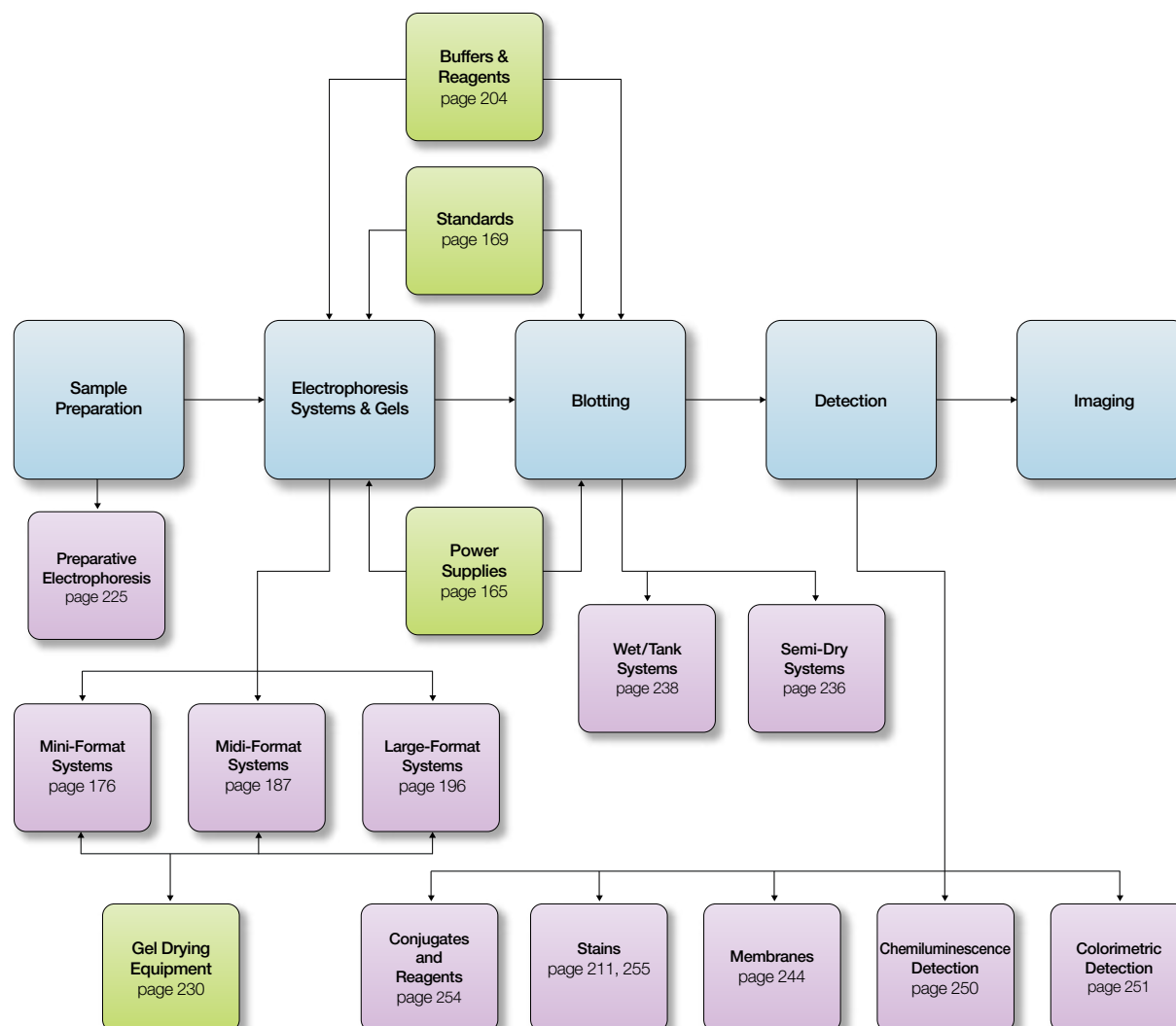
Electrophoresis and Blotting Solutions

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	<p>Run 1–4 precast or handcast gels in mini format with the Mini-PROTEAN Tetra cell</p> <p>Wing clamp assembly allows easy, fast setup and leak-free operation</p> <p>Minimize reagent cost and waste</p> <p>Fastest turnaround of 2-D data for 2-D-in-a-day capability</p> <p>Run up to 12 mini handcast or precast gels with the Mini-PROTEAN® Dodeca™ cell</p>	<p>Fast setup with drop-in gel and cell design (precast or handcast)</p> <p>Run 1–2 precast Criterion or handcast gels with the Criterion cell</p> <p>Integrated upper buffer chamber ensures leak-free operation</p> <p>Optimal combination of pI separation and fast run times</p> <p>Capability for <1 hr 2-D runs for 2-D-in-a-day results</p> <p>Run up to 12 midi handcast or precast gels with the Mini-PROTEAN Dodeca cell</p>	<p>Large-format gel system offers greater resolution over smaller formats and can be used with handcast gels</p> <p>Versatility to perform 1-D or 2-D gel electrophoresis</p> <p>Can accommodate up to 4 gels and is available in xi or XL format for running a variety of gel sizes</p> <p>Multi-cell is available for running up to 6 gels</p>	<p>Offers maximum resolution in a single gel and the longest range of MW separation</p> <p>Run up to 12 gels with the PROTEAN Plus Dodeca cell</p>
Compatible Gel Formats	<p>Precast</p> <p>Mini-PROTEAN precast gels (page 180)</p> <p>Ready Gel® precast gels (page 183)</p> <p>Handcast</p> <p>Mini-PROTEAN empty cassettes (page 186)</p> <p>Mini-PROTEAN casting plates (page 187)</p>	<p>Criterion, Criterion™ TGX™, and Criterion XT precast gels (page 189)</p> <p>Criterion empty cassettes (page 194)</p>	<p>PROTEAN II casting plates (page 199)</p>	<p>PROTEAN Plus casting equipment (page 202)</p>
Electrophoresis Cells	<p>Mini-PROTEAN Tetra (page 176)</p> <p>Mini-PROTEAN 3 Dodeca (page 179)</p>	<p>Criterion (page 187)</p> <p>Criterion Dodeca (page 188)</p>	<p>PROTEAN II xi/XL (page 198)</p> <p>PROTEAN II xi/XL multi-cells (pages 200)</p>	<p>PROTEAN Plus Dodeca (page 201)</p>

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 238) Criterion blotter (page 239) Trans-Blot® cell (page 240)	Criterion wire blotter (page 239) Criterion plate blotter (page 239) Trans-Blot cell (page 240) Trans-Blot Plus cell (page 241)	Trans-Blot cell (page 240) Trans-Blot Plus cell (page 241)	Trans-Blot Plus cell (page 241)
Semi-dry transfer	Trans-Blot SD cell (page 237) Trans-Blot Turbo (page 236)	Trans-Blot SD cell (page 237) Trans-Blot Turbo (page 236)	Trans-Blot SD cell (page 237)	

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 toward the bottom of the gel restrict excessive separations of small molecules.

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)			Typical Conditions** (Final)			Typical Run Time	PowerPac™ Power Supply
		W	V	mA	W	V	mA		
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	200.0 x 205.0 x 1.0 mm, 12 gels	—	200(C)	1,000	—	200(C)	350	6 hr	HC or Universal
Dodeca™ cell	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 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
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)			Typical Conditions** (Final)			Typical Run Time	PowerPac Power Supply
		W	V	mA	W	V	mA		
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	10–300 V	5–250 V	20–5,000 V	10–500 V
Current	4–400 mA	0.01–3.0 A	0.01–500 mA	0.01–2.5 A
Power	75 W (maximum)	1–300 W	1–400 W	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: 6371

See Also

Mini-PROTEAN
Tetra cell:
page 176.
Criterion cell:
page 187.
Sub-Cell systems:
page 256.

Ordering Information

Catalog #	Description
1645050	PowerPac Basic Power Supply, 100–120/220–240 V

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: 6371

See Also

Criterion blotter:
page 239.
Mini Trans-Blot cell:
page 238.
Trans-Blot cell:
page 240.
Trans-Blot Plus cell:
page 241.
Dodeca cells:
page 179, 187, 201.

Ordering Information

Catalog #	Description
1645052	PowerPac HC Power Supply, 100–120/220–240 V

PowerPac™ HV High-Voltage Power Supply



- Ideal for IEF and DNA sequencing
- Output of 5,000 V, 500 mA, and 400 W

Optional temperature probe monitors gel temperature between 30–90°C during electrophoresis. The probe attaches to the glass plate and sends temperature data to the power supply, which adjusts the power output to maintain a constant temperature during electrophoresis.

For More Information
Request or download bulletin: 6371

See Also

Model 491 prep cell
and mini prep cell:
page 227.

Ordering Information

Catalog #	Description
1645056	PowerPac HV Power Supply, 100–120/220–240 V
1645059	PowerPac HV Power Supply with Temperature Probe, 100–120/220–240 V
1645097	PowerPac Data Transfer Software, version 2.0
1645099	PowerPac HV IQ/OQ Protocol Binder
1655058	PowerPac Temperature Probe

See Also

High-throughput electrophoresis systems: page 201, 200.
Western blotting: page 233.
Northern and Southern blotting: page 276.

PowerPac™ Universal Power Supply



- For all applications from mini vertical and high-throughput electrophoresis to blotting
- Protocol binder and test 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: 6371](#)

Ordering Information

Catalog #	Description
1645070	PowerPac Universal Power Supply , 100–120/220–240 V
1645097	PowerPac Data Transfer Software , version 2.0
1645069	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
1645062	PowerPac Adaptor , 2 mm
1645064	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 181 (Mini-PROTEAN® TGX™ gels), 183 (Ready Gel® gels), and 190 (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 (#1610377) 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: page 176.
Horizontal electrophoresis systems: page 256.
Electrophoresis and blotting buffers: pages 204, 248.
Protein electrophoresis stains: page 211.
Protein blotting stains: page 255.
Gel Doc EZ imaging system: page 293.
ChemiDoc MP imaging system: page 292.

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)

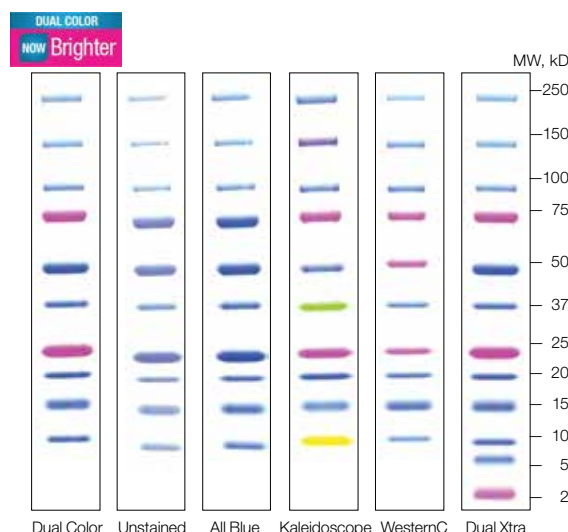
NEW New and Improved Dual Color Standard

- Brighter for easier identification of target proteins
- Stronger band intensity throughout blot development
- Sharper for more accurate molecular weight estimation

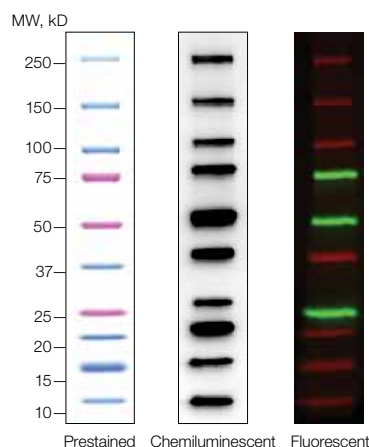
Precision Plus Protein™ WesternC™ Standards

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



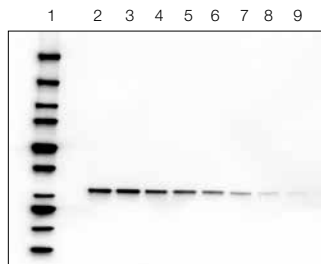
The Precision Plus Protein standards family.



Precision Plus Protein WesternC standards and its multiple applications offer many detection options.

For More Information

Request or download bulletins: 2847, 5561, and 5576; multiplex fluorescence detection — 5685 and 5723



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/ppstandards

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

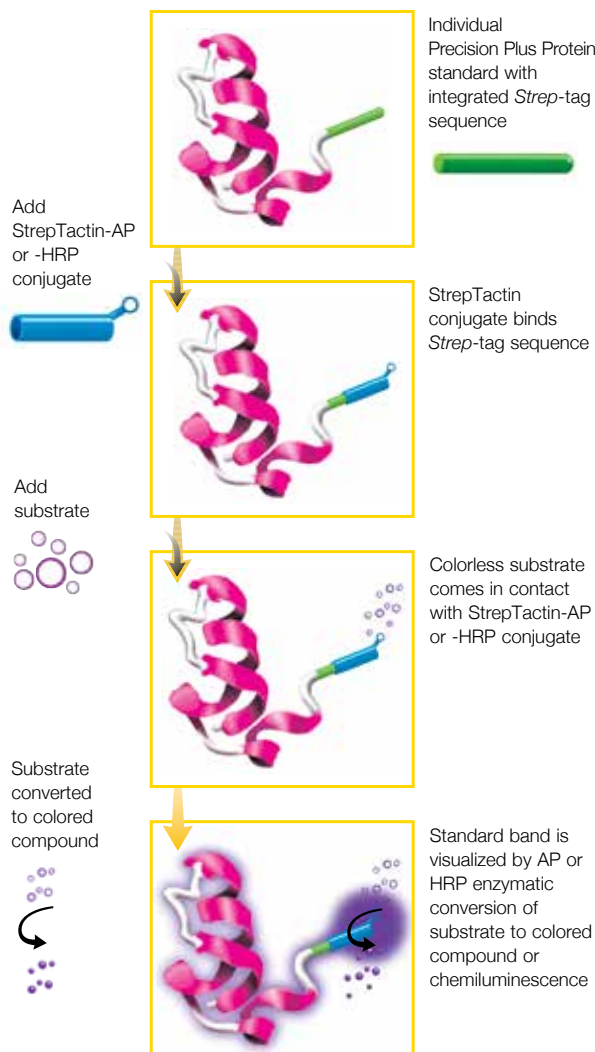


Precision Plus Protein Standard Plugs

For More Information

Web: www.bio-rad.com/standardplugs

Request or download bulletin: 3036



Overview of the StrepTactin detection system.

Protein Electrophoresis

Protein Standards

www.bio-rad.com/proteinstandards

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	6 months at 4°C or 1 year at -20°C
Dual Color	500 µl	50	6 months at 4°C or 1 year at -20°C
Kaleidoscope	500 µl	50	1 year at -20°C
Dual Xtra	500 µl	50	6 months at 4°C or 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	1 month 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 (#1610382).

Ordering Information

Catalog #	Description
1610363	Precision Plus Protein Unstained Standards , 1,000 µl, 100 applications
1610396	Precision Plus Protein Unstained Standards Value Pack , 5 x 1,000 µl, 500 applications
1610373	Precision Plus Protein All Blue Standards , 500 µl, 50 applications
1610393	Precision Plus Protein All Blue Standards Value Pack , 5 x 500 µl, 250 applications
1610374	Precision Plus Protein Dual Color Standards , 500 µl, 50 applications
1610394	Precision Plus Protein Dual Color Standards Value Pack , 5 x 500 µl, 250 applications
1610375	Precision Plus Protein Kaleidoscope Standards , 500 µl, 50 applications
1610395	Precision Plus Protein Kaleidoscope Standards Value Pack , 5 x 500 µl, 250 applications
1610385*	Precision Plus Protein WesternC Pack , 250 µl WesternC standard, 125 µl HRP conjugate, 50 applications
1610398*	Precision Plus Protein WesternC Pack, HRP Value Pack , 5 x 250 µl WesternC standard, 5 x 125 µl HRP conjugate, 250 applications
1610376*	Precision Plus Protein WesternC Standards , 250 µl, 50 applications
1610399*	Precision Plus Protein WesternC Standards Value Pack , 5 x 250 µl, 250 applications
1610377	Precision Plus Protein Dual Xtra Standards , 500 µl, 50 applications
1610397	Precision Plus Protein Dual Xtra Standards Value Pack , 5 x 500 µl, 250 applications
StrepTactin Conjugates for Precision Plus Protein Standards	
1610380	Precision Protein StrepTactin-HRP Conjugate , 300 µl, 150 applications
1610381	Precision Protein StrepTactin-HRP Conjugate , 125 µl, 50 applications
1610382	Precision Protein StrepTactin-AP Conjugate , 300 µl, 150 applications
Precision Plus Protein Standard Plugs	
1610378	Precision Plus Protein Standard Plugs , unstained, 24 applications
Clarity Western ECL Substrate	
1705060	Clarity Western ECL Substrate , 200 ml
1705061	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 170) will provide increased accuracy and consistency.

For More Information

Web: www.bio-rad.com/naturalstandards

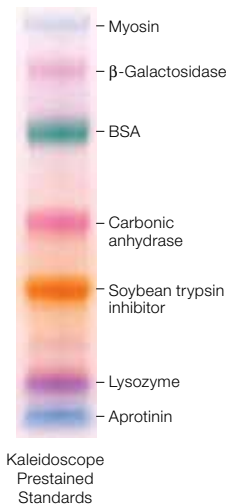
Kaleidoscope™ Standards

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.



Ordering Information

Catalog #	Description
1610324	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

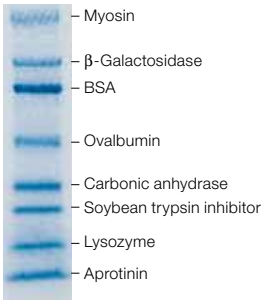
Bio-Rad's original prestained SDS-PAGE standards are available in broad, low, and high ranges.

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
1610318	Prestained SDS-PAGE Standards , broad range, 500 µl
1610305	Prestained SDS-PAGE Standards , low range, 500 µl
1610309	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: page 211.
Protein blotting stains: page 255.
Electrophoresis and blotting buffers: page 204, 248.
Gel Doc EZ imaging system: page 293.

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, μ l	Applications* (Number of Mini Gels)
SDS-PAGE standards	200	800–1,600
Polypeptide standards	200	800

* Number of applications depends on staining method.

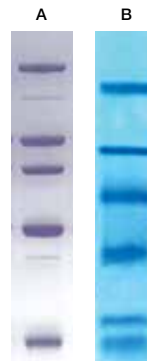
For More Information

Web: www.bio-rad.com/naturalstandards

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

Protein	Source	MW, kD	Ranges Available*			
			Broad	Low	High	Polypeptide
Myosin	Rabbit skeletal muscle	200.0	•		•	
β -Galactosidase	<i>E. coli</i>	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	<i>Bacillus licheniformis</i>	1.4				•

* SDS-PAGE — broad, low, high, and polypeptide.

See Also

Vertical electrophoresis systems: page 176.
Electrophoresis and blotting buffers: page 204, 248.
Protein electrophoresis stains: page 211.
Protein blotting stains: page 255.

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
1610317	SDS-PAGE Standards, broad range, 200 μ l
1610304	SDS-PAGE Standards, low range, 200 μ l
1610303	SDS-PAGE Standards, high range, 200 μ l
1610326	Polypeptide SDS-PAGE Standards, 200 μ l

Specialty Standards (IEF and 2-D SDS-PAGE)

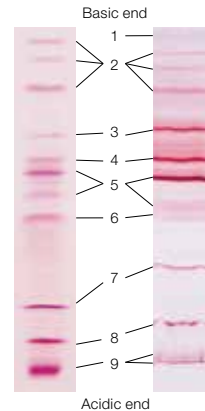
IEF Standards

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

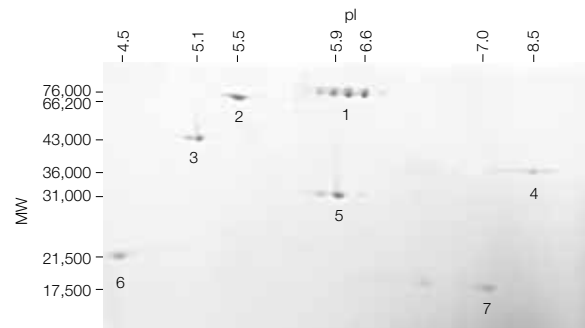
1610310 IEF Standards, 250 μ l

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

1610320 2-D SDS-PAGE Standards, 500 μ l

Mini-Format 1-D Electrophoresis Systems

The Mini-PROTEAN® system includes the four-gel Mini-PROTEAN Tetra cell and the high-throughput, 12-gel Mini-PROTEAN® 3 Dodeca™ cell. The systems are compatible with mini handcast or precast gels.

See Also

PowerPac Basic and PowerPac HC power supplies: page 167.

Premixed buffers and buffer reagents: page 204.

Mini-PROTEAN precast gels: page 180.

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 such as #1658000 (10-well, 0.75 mm) or #1658001 (10-well, 1.0 mm). To configure your own electrophoresis cell, order the Mini-PROTEAN Tetra cell (#1658004) and select a casting module from the ordering information (see page 178).

For More Information

Web: www.bio-rad.com/tetra

Request or download bulletin: 5535

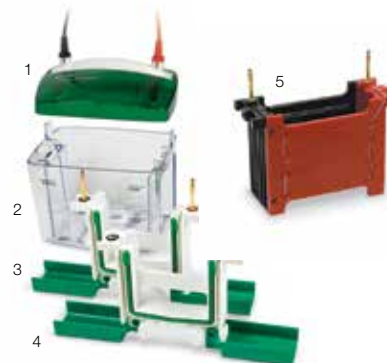
Mini-PROTEAN Tetra cell components:

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.



* 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. 165
Glass plate size (W x L)	Short plate: 10.1 x 7.3 cm	Dimensions (W x L x H)	12.0 x 16.0 x 18.0 cm
	Spacer plate: 10.1 x 8.2 cm	Weight	1 kg (2.2 lb)

Ordering Information

Catalog #	Description
1658000FC	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
1658001FC	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
1658002FC*	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
1658003FC*	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
1658004	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
1658005*	Mini-PROTEAN Tetra Cell for Mini Precast Gels , 2-gel system includes electrode assembly, tank, lid with power cables, mini cell buffer dam
1658006FC	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
1658007FC*	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

1658025FC	Mini-PROTEAN Tetra Cell and PowerPac Basic Power Supply , includes #1658001 and #1645050
1658026FC	Mini-PROTEAN Tetra Cell and PowerPac Universal Power Supply , includes #1658001 and #1645070
1658027FC	Mini-PROTEAN Tetra Cell and PowerPac HC Power Supply , includes #1658001 and #1645052
1658028FC	Mini-PROTEAN Tetra Cell and PowerPac HV Power Supply , includes #1658001 and #1645056
1658029FC	Mini-PROTEAN Tetra Cell and Mini Trans-Blot Module , includes #1658001 and #1703935
1658030	Mini-PROTEAN Tetra Cell for Mini Precast Gels and Mini Trans-Blot Module , includes #1658004 and #1703935
1658033FC	Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes #1658001, #1703935, and #1645050
1658034FC	Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes #1658004, #1703935, and #1645050
1658035FC	Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes #1658001, #1703935, and #1645052
1658036	Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes #1658004, #1703935, and #1645052

continues

The catalog numbers above with an "FC" suffix come with a 10% TGX StainFree FastCast kit (1610182). To place an order without a FastCast kit, remove the "FC" suffix from the catalog number.

Protein Electrophoresis

Mini-Format 1-D Electrophoresis Systems

www.bio-rad.com/minielectro

Ordering Information

Description	0.75 mm	1.0 mm	1.5 mm
Casting Modules**			
5-Well	1658008	1658013	1658019
9-Well	1658009	1658014	1658020
10-Well	1658010	1658015	1658021
15-Well	1658011	1658016	1658022
Prep/2-D Well	1658012	1658017	1658023
IPG Well	—	1658018	1658024
Mini-PROTEAN Combs (5) for Hand Casting with Glass Plates			
5-Well	1653352	1653357	1653363
9-Well	1653353	1653358	1653364
10-Well	1653354	1653359	1653365
15-Well	1653355	1653360	1653366
Prep/2-D + 1 Reference Well	1653356	1653361	1653367
IPG Well	—	1653362	1653368

Catalog # Description

Handcast Gel Accessories and Replacement Parts

1658051	Mini-PROTEAN Tetra Cell Casting Stand , 2 core, includes clamps for use with the Mini-PROTEAN Tetra cell casting modules
1658052	Mini-PROTEAN Tetra Cell Casting Stand , 1 core, includes clamps for use with the Mini-PROTEAN Tetra cell casting modules
1653303	Mini-PROTEAN Casting Stand with Gaskets
1653304	Mini-PROTEAN Casting Frame
1653305	Mini-PROTEAN Casting Stand Gaskets , replacement, 2
1653308	Short Plates , 5
1653149	Replacement Gaskets , for electrophoresis clamping frame, green, 2
1653310	Spacer Plates with 0.75 mm Integrated Spacers , 5
1653311	Spacer Plates with 1.0 mm Integrated Spacers , 5
1653312	Spacer Plates with 1.5 mm Integrated Spacers , 5

Other Replacement Parts and Accessories

1658037	Mini-PROTEAN Tetra Electrode Assembly
1658038	Mini-PROTEAN Tetra Companion Running Module
1658039	Buffer Tank , replacement
1658040	Buffer Tank and Lid , replacement
1658041	Cell Lid with Power Cables
1653201	Sample Loading Guide , 9-well (red)
1653146	Sample Loading Guide , 10-well (yellow)
1653203	Sample Loading Guide , 12-well (green)
1653132	Sample Loading Guide , 15-well (blue)
1653130	Mini Cell Buffer Dams , 2 (compatible with Mini-PROTEAN Tetra cell, Mini-PROTEAN 3 Dodeca cell, and the discontinued Mini-PROTEAN 3 cell)
1653320	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.

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 page 186) and Model 485 gradient former (see page 186). 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
1654100	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
1654101	Mini-PROTEAN 3 Dodeca Cell with Multi-Casting Chamber , same as #1654100 with multi-casting chamber, 15 separation sheets, 8 acrylic blocks, tapered luer connector, stopcock valve
1655132	Mini-PROTEAN 3 Dodeca Cell and 6-Row AnyGel Stand , includes #1654100 and #1655131

Replacement Parts and Accessories

1654102	Replacement Electrophoresis Clamping Frame
1653149	Replacement Gaskets , for electrophoresis clamping frame, green, 2
1654103	Lower Electrode Assembly with Platinum Wire
1654104	Replacement Drain Line
1654105	Replacement Cooling Coil , includes connector tubing
1652948	Replacement Power Cables , for lid
1653320	Gel Releasers , 5
1653130	Mini Cell Buffer Dams , 2 (compatible with Mini-PROTEAN Tetra cell, Mini-PROTEAN 3 Dodeca cell, and the discontinued Mini-PROTEAN 3 cell)
1655131	AnyGel Stand , 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Ready Gel mini gels

See Also

PowerPac HC power supply: page 167.
Mini-PROTEAN precast gels: page 180.
AnyGel stands: page 185.

Mini-PROTEAN® Precast Gels

Mini-PROTEAN® TGX™ Precast Gels

Long shelf life Mini-PROTEAN TGX precast gels 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. Gel opening lever (456-0000) sold separately.

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

For More Information

Web: www.bio-rad.com/tgx

Request or download bulletins: 5535 and 5871

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 Bio-Rad's stain-free enabled imaging systems (see page 290).

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 chromatography, western blotting, standard staining methods, and mass spectrometry analysis

For More Information

Web: www.bio-rad.com/ministainfree



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.

Mini-PROTEAN Gels

Mini-PROTEAN Tris-Tricine Precast Gels

- Designed for separation of peptides and small proteins with MWs <10,000

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

For More Information

Web: www.bio-rad.com/mpgels

Gel Cassette Specifications

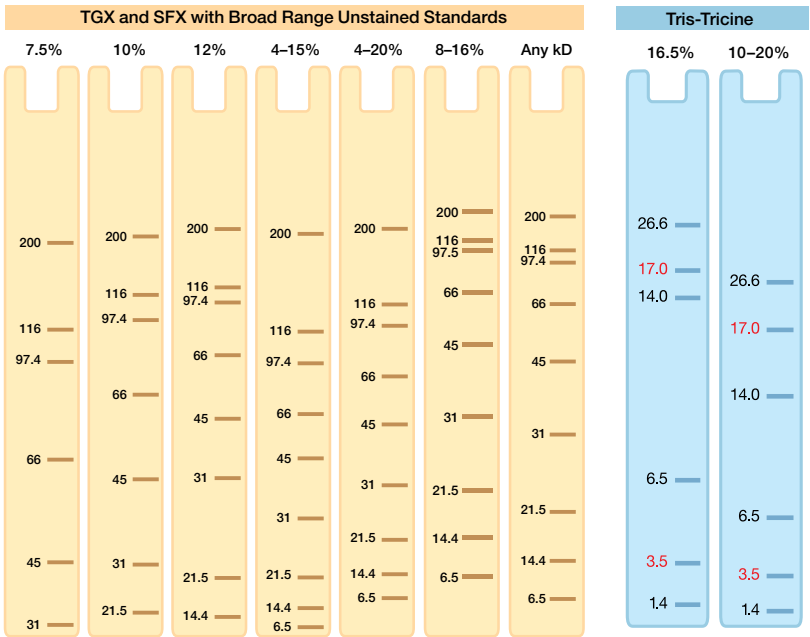
Gel dimensions (W x L x thickness)	86.0 x 72.0 x 1.0 mm
Gel cassette dimensions (W x L x thickness)	101.0 x 89.0 x 4.6 mm
Cassette material	Styrene copolymer
Comb material	Polycarbonate
Gel storage conditions	Store flat at 4°C; do not freeze

Mini-PROTEAN Precast Gel Selection Guide

	TGX, TGX Stain-Free	Tris-Tricine	TBE, TBE-Urea
Shelf Life at Recommended Temperature*	12 months	8–12 weeks	8–12 weeks
Recommended Buffers			
Sample (dilute 1:1 with sample)	Laemmli	Tricine	Nucleic acid, TBE-urea
Running	Tris/glycine/SDS	Tris/Tricine/SDS	Tris/boric acid/EDTA (TBE)

* From date of manufacture.

Mini-PROTEAN Precast Gel Migration Charts









Protein Electrophoresis

Mini-Format 1-D Electrophoresis Systems

www.bio-rad.com/minielectro

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	4561029	4561023	4561024	4561025	4561026	4561021
10% Resolving Gel	4561039	4561033	4561034	4561035	4561036	4561031
12% Resolving Gel	4561049	4561043	4561044	4561045	4561046	4561041
4–15% Resolving Gel	4561089	4561083	4561084	4561085	4561086	4561081
4–20% Resolving Gel	4561099	4561093	4561094	4561095	4561096	4561091
8–16% Resolving Gel	4561109	4561103	4561104	4561105	4561106	4561101
Any kD Resolving Gel	4569039	4569033	4569034	4569035	4569036	4569031
Mini-PROTEAN TGX Stain-Free Precast Gels**						
7.5% Resolving Gel	4568029	4568023	4568024	4568025	4568026	4568021
10% Resolving Gel	4568039	4568033	4568034	4568035	4568036	4568031
12% Resolving Gel	4568049	4568043	4568044	4568045	4568046	4568041
4–15% Resolving Gel	4568089	4568083	4568084	4568085	4568086	4568081
4–20% Resolving Gel	4568099	4568093	4568094	4568095	4568096	4568091
8–16% Resolving Gel	4568109	4568103	4568104	4568105	4568106	4568101
Any kD Resolving Gel	4568129	4568123	4568124	4568125	4568126	4568121

Empty Cassettes and Combs

Mini-PROTEAN Empty Cassette***	—	4560003	—	4560005	4560006	4560001
Combs (for Mini-PROTEAN empty cassettes)	—	4560013	—	4560015	4560016	4560011

* 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, #1610378.

Catalog #	Description
4560000	Mini-PROTEAN Precast Gel Opening Lever
Premixed Buffers for Mini-PROTEAN TGX Gels*	
1610737	2x Laemmli Sample Buffer, 30 ml
1610747	4x Laemmli Sample Buffer, 10 ml
1610738	2x Native Sample Buffer, 30 ml
1610732	10x Tris/Glycine/SDS, 1 L
1610734	10x Tris/Glycine, 1 L
* For 5 L volume of the running buffers, see page 205.	

Applications Guide

1658100	Mini-PROTEAN Gel Instruction Manual and Application Guide, online
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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	4565013	4565014*	4565015*	4565016	—
10% TBE	4565033	4565034*	4565035	4565036	—
15% TBE	4565053*	4565054	4565055*	4565056	—
4–20% TBE	4565093*	4565094*	4565095*	4565096*	—
10% TBE-Urea	4566033*	—	—	4566036*	—
15% TBE-Urea	4566053*	—	4566055*	4566056*	—
16.5% Tris-Tricine	4563063	4563064	4563065*	4563066	—
10–20% Tris-Tricine	4563113	4563114	4563115*	4563116*	—

* 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, #1610378.

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; page 176) or, for high-throughput applications, the Mini-PROTEAN® 3 Dodeca™ cell (1–12 gels; page 179). 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 \(LIT188\)](#)

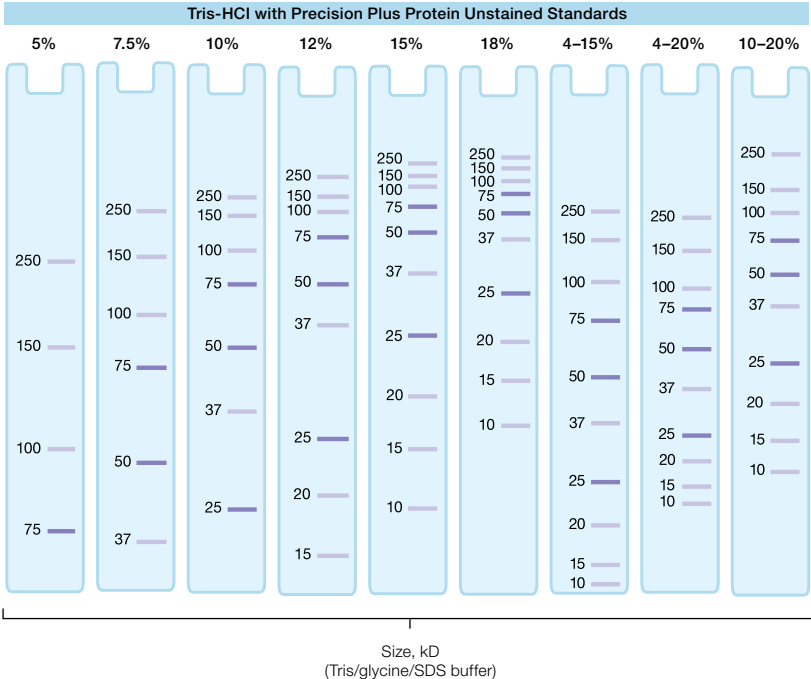


Specifications

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



See Also

ReadyStrip IPG strips; page 217.

Standards: page 169.

Electrophoresis stains: page 211.

Mini Trans-Blot cell: page 238.

Blot detection: page 249.

PowerPac Basic and PowerPac HC power supplies: page 167.

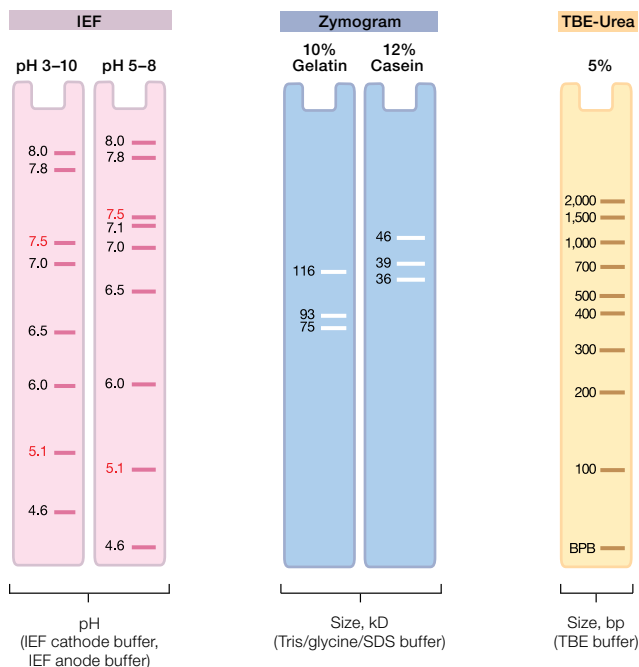
Imaging systems: page 290.

Premixed buffers: page 204.

Protein Electrophoresis

Mini-Format 1-D Electrophoresis Systems

www.bio-rad.com/minielectro



Ordering Information

Description	10-Well 30 µl	15-Well 15 µl	10-Well 50 µl
Ready Gel Tris-HCl Gels			
5% Resolving Gel	—	—	1611213
7.5% Resolving Gel	—	—	1611154
10% Resolving Gel	—	—	1611155
12% Resolving Gel	—	—	1611156
15% Resolving Gel	1611103	—	1611157
18% Resolving Gel	—	—	1611219
4–15% Linear Gradient	—	1611122	1611158
4–20% Linear Gradient	1611105	1611123	1611159
10–20% Linear Gradient	—	1611124	1611160
Ready Gel IEF Gels			
pH 3–10	1611112	—	—
pH 5–8	—	—	1611165
Ready Gel Zymogram Gels			
10% Zymogram Gel with Gelatin	—	—	1611167
12% Zymogram Gel with Casein	—	—	1611168*
Ready Gel TBE-Urea Gels			
5% TBE-Urea Gel	1611115*	—	—

* Please allow up to 2 weeks for delivery.

continues

Ordering Information

Catalog # Description

Premixed Buffers for Tris-HCl Gels

1610737	2x Laemmli Sample Buffer, 30 ml
1610747	4x Laemmli Sample Buffer, 10 ml
1610738	2x Native Sample Buffer, 30 ml
1610732	10x Tris/Glycine/SDS, 1 L
1610734	10x Tris/Glycine, 1 L
1610772	10x Tris/Glycine/SDS, 5 L cube
1610771	10x Tris/Glycine, 5 L cube

Premixed Buffers for Tris-Tricine Gels for Peptides

1610739	2x Tricine Sample Buffer, 30 ml
1610744	10x Tris/Tricine/SDS, 1 L

Premixed Buffers for IEF Gels

1610763	IEF Sample Buffer, 30 ml
1610761	10x IEF Anode Buffer, 250 ml
1610762	10x IEF Cathode Buffer, 250 ml

Premixed Buffers for Zymogram Gels

1610764	Zymogram Sample Buffer, 30 ml
1610765	10x Zymogram Renaturation Buffer, 125 ml
1610766	10x Zymogram Development Buffer, 125 ml

Premixed Buffers for TBE and TBE-Urea Gels

1610767	5x Nucleic Acid Sample Loading Buffer, 10 ml
1610768	2x TBE-Urea Sample Buffer, 30 ml
1610770	10x Tris/Boric Acid/EDTA (TBE), 5 L cube

Accessories

1610992	Ready Gel Key Knife, free upon request with Ready Gel purchase
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Mini-PROTEAN® Hand Casting Accessories**Empty Cassettes**

Single-use empty Mini-PROTEAN cassettes are available for hand casting a mini gel.

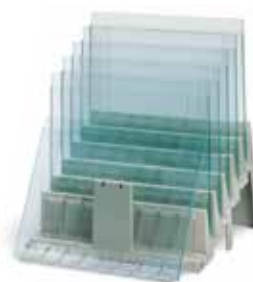
AnyGel™ Stands

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

See Also

Acrylamide gel-casting reagents: page 207.
Buffers: page 205.

Protein Electrophoresis

Mini-Format 1-D Electrophoresis Systems

www.bio-rad.com/minielectro

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.



Model 485 Gradient Former

For More Information

Web: www.bio-rad.com/mphandcast

Ordering Information

Catalog #	Description
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Mini-PROTEAN Empty Cassettes and Combs

4560003	Mini-PROTEAN Empty Cassettes, 10-well, 50 each
4560005	Mini-PROTEAN Empty Cassettes, 12-well, 50 each
4560006	Mini-PROTEAN Empty Cassettes, 15-well, 50 each
4560001	Mini-PROTEAN Empty Cassettes, IPG-well, 7 cm IPG strip, 50 each
4560013	Mini-PROTEAN Combs, 10-well, 50 combs
4560015	Mini-PROTEAN Combs, 12-well, 50 combs
4560016	Mini-PROTEAN Combs, 15-well, 50 combs
4560011*	Mini-PROTEAN Combs, IPG, 50 combs

AnyGel Stands and Accessories

1654131	AnyGel Stand, single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN or Ready Gel mini gels
1655131	AnyGel Stand, 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Mini-PROTEAN or Ready Gel mini gels
1654132	Replacement Clamps, 2

AnyGel Stands and Electrophoresis Cells

1655134	PROTEAN Plus Dodeca Cell (100/120 V) and Two 6-Row AnyGel Stands, includes #1654150 and two #1655131
1655135	PROTEAN Plus Dodeca Cell (220/240 V) and Two 6-Row AnyGel Stands, includes #1654151 and two #1655131
1655133	Criterion Dodeca Cell and 6-Row AnyGel Stand, includes #1654130 and #1655131
1656020	Criterion Cell and Single-Row AnyGel Stand, includes #1656001 and #1654131

Mini-PROTEAN 3 Multi-Casting Chambers

1654110**	Mini-PROTEAN 3 Multi-Casting Chamber, includes 15 separation sheets, 8 acrylic blocks, tapered luer connector, stopcock valve (order glass plates and combs separately)
1654111**	Mini-PROTEAN 3 Multi-Casting Chamber, 0.75 mm, includes 15 sets of glass plates
1654112**	Mini-PROTEAN 3 Multi-Casting Chamber, 1.0 mm, includes 15 sets of glass plates
1654113**	Mini-PROTEAN 3 Multi-Casting Chamber, 1.5 mm, includes 15 sets of glass plates
1654116**	Mini-PROTEAN 3 Multi-Casting Chamber, 0.5 mm, includes 15 sets of glass plates

Mini-PROTEAN 3 Multi-Casting Chamber Accessories

1654114	Acrylic Blocks, 6.0 mm, 8
1654115	Separation Sheets, 15
1653320	Gel Releasers, 5
1652913	Replacement Gaskets, for Mini-PROTEAN 3 multi-casting chamber, includes 3' of tubing

continues

Ordering Information

Catalog #	Description
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Combs[®], ^{***} and Glass Plates for 2-D Electrophoresis

1653308	Short Plates, 5
1653310	Spacer Plates with 0.75 mm Integrated Spacers, 5
1653311	Spacer Plates with 1.0 mm Integrated Spacers, 5
1653312	Spacer Plates with 1.5 mm Integrated Spacers, 5
1653362	Mini-PROTEAN Comb, IPG well, 1.0 mm
1653368	Mini-PROTEAN Comb, IPG well, 1.5 mm
1653356	Mini-PROTEAN Comb, prep/2-D well, 0.75 mm
1653361	Mini-PROTEAN Comb, prep/2-D well, 1.0 mm
1653367	Mini-PROTEAN Comb, prep/2-D well, 1.5 mm

Model 485 Gradient Former

1654120	Model 485 Gradient Former, 40–175 ml, includes body with valve stem and tubing connection kit
1654122	Model 485 Gradient Former and Mini-PROTEAN 3 Multi-Casting Chamber, includes #1654120 and #1654110

Model 485 Gradient Former Accessories

1652006	Exponential Piston, for Model 385 and Model 485 gradient formers
1652007	Gradient Pouring Needles, 2
1652008	Tubing Connection Kit, includes stopcock, luer taper coupling, tubing (1/8" ID, 3'), Y-connector

* Catalog #4560011 is an IPG well only, no reference well. If a protein standard is needed on gel, order Precision Plus Protein standard plugs #1610378.

** Order combs separately (see combs for use with glass plates on page 178) in the Mini-PROTEAN Tetra cell section.

***For multi-well comb configurations, refer to page 178.

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.

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.



See Also

Criterion precast gels and empty cassettes: page 189.

Criterion blotter: page 239.

PowerPac Basic and PowerPac HC power supplies: page 167.

Dodeca stainers: page 194.

AnyGel stands: page 194.

Protein Electrophoresis

Midi-Format 1-D Electrophoresis Systems

www.bio-rad.com/midielectro

See Also

PowerPac Basic and PowerPac HC power supplies: page 167.

Criterion precast gels and accessories: page 189.

Trans-Blot Plus cell: page 241.

Dodeca stainers: page 194.

Imaging systems: page 290.

Imaging software: page 302.

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 to maintain 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

* 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
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Criterion Cell and Systems

1656001	Criterion Cell , includes electrophoresis buffer tank, lid with power cables, 3 sample loading guides (12+2 well, 18-well, 26-well)
1656019	Criterion Cell and PowerPac Basic Power Supply , 100–120/220–240 V, includes #1656001 and #1645050
1656020	Criterion Cell and Single-Row AnyGel Stand , includes #1656001 and #1654131

Criterion Cell and Blotter Systems

1656024	Criterion Cell/Plate Blotter System , includes #1656001 and #1704070
1656025	Criterion Cell/Wire Blotter System , includes #1656001 and #1704071

Replacement Parts

1656002	Criterion Replacement Electrophoresis Buffer Tank , with lower electrodes
1656003	Criterion Replacement Lid , with upper electrodes
1656004	Criterion Replacement Upper Electrode , includes prestrung platinum wire
1656005	Criterion Replacement Lower Electrode , includes prestrung platinum wire
1652948	Replacement Power Cables , for lid
1654131	AnyGel Stand , single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN or Ready Gel mini gels

Criterion Dodeca Cell

1654130	Criterion Dodeca Cell , includes electrophoresis buffer tank with built-in cooling coil, lid with power cables
1654138	Criterion Dodeca Cell and PowerPac HC Power Supply , includes #1654130 and #1645052
1654139	Criterion Dodeca Cell and PowerPac Universal Power Supply , includes #1654130 and #1645070
1655133	Criterion Dodeca Cell and 6-Row AnyGel Stand , includes #1654130 and #1655131

Replacement Parts

1654104	Replacement Drain Line
1654135	Lower Electrode with Platinum Wire
1654136	Replacement Cooling Coil , includes connector tubing
1654137	Replacement Lid
1652948	Replacement Power Cables , for lid

Criterion™ Precast Gels

Criterion precast gels include a broad selection of midi 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 187) and 1–12 gels can be run in the high-throughput Criterion Dodeca cell (page 188).

- 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.

* U.S. patent 6,093,301.



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

See Also

Premixed buffers:
page 204.
ReadyStrip IPG strips:
page 217.
Criterion blotter:
page 239.
PowerPac
power supplies:
page 167.
Dodeca stainers:
page 194.
Criterion staining
trays: page 194.
Standards:
page 169.
Electrophoresis
stains:
page 211.

Protein Electrophoresis

Midi-Format 1-D Electrophoresis Systems

www.bio-rad.com/midielectro

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 Bio-Rad's stain-free enabled imaging systems (see page 290).

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 chromatography, western blotting, standard staining methods, and mass spectrometry analysis

For More Information

Web: www.bio-rad.com/midistainfree
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.

For More Information

Web: www.bio-rad.com/criteriongels

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/criterionstainfree



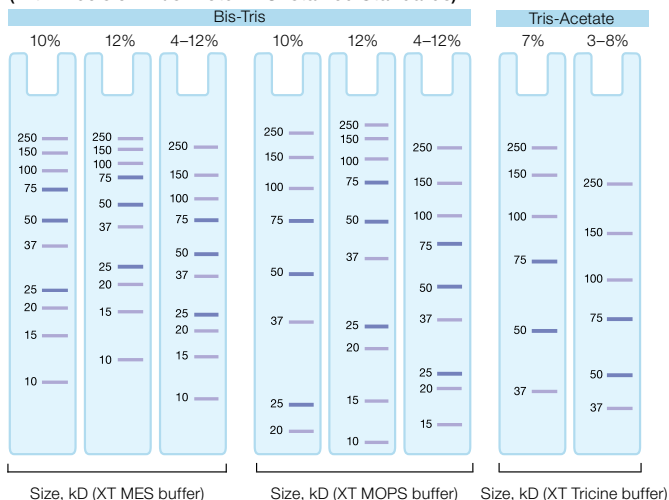
Specifications

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

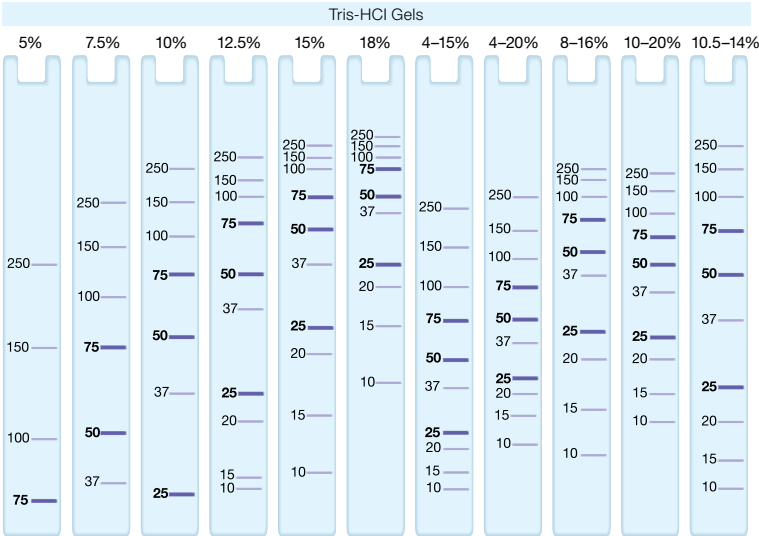
* From date of manufacture.

Criterion XT Migration Charts

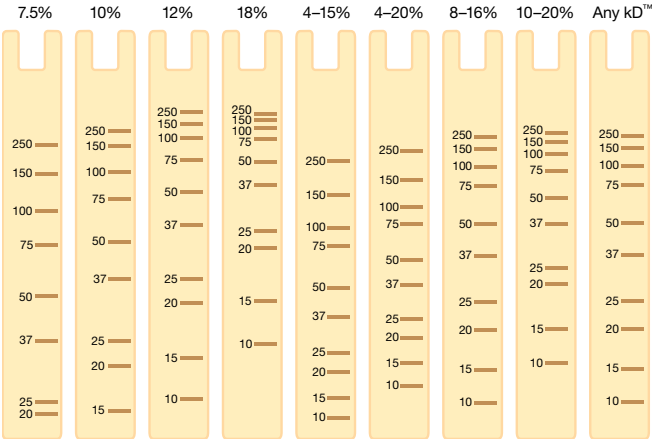
(with Precision Plus Protein™ Unstained Standards)



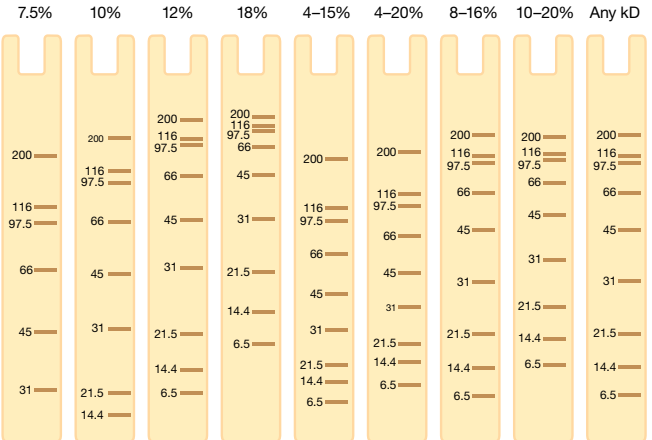
Criterion Migration Charts
(with Precision Plus Protein
Unstained Standards)



**Criterion™ TGX™ and TGX Stain-Free
Migration Charts** (with Precision Plus
Protein Unstained Standards)



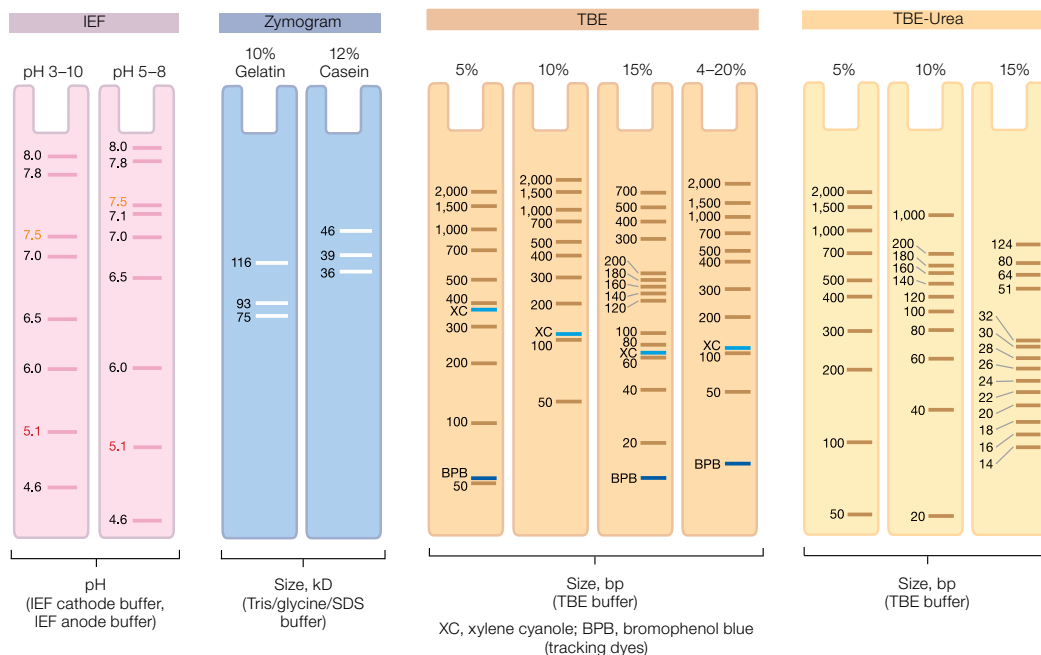
**Criterion TGX and TGX Stain-Free
Migration Charts**
(with Broad Range Unstained
Protein Standards)



Protein Electrophoresis

Midi-Format 1-D Electrophoresis Systems

www.bio-rad.com/midielectro



Ordering Information

Description	12+2-Well*, ** 45 µl	18-Well 50 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	5671023	5671024	5671025	—	—
10% Resolving Gel	5671033	5671034	5671035	—	—
12% Resolving Gel	5671043	5671044	5671045	—	—
18% Resolving Gel	5671073	5671074	5671075	5671072	5671071
4–15% Linear Gradient	5671083	5671084	5671085	5671082	5671081
4–20% Linear Gradient	5671093	5671094	5671095	5671092	5671091
8–16% Linear Gradient	5671103	5671104	5671105	5671102	5671101
10–20% Linear Gradient	5671113	5671114	5671115	5671112	5671111
Any kD Gel	5671123	5671124	5671125	5671122	5671121
Criterion TGX Stain-Free Precast Gels					
7.5% Gel	5678023	5678024	5678025	—	—
10% Gel	5678033	5678034	5678035	—	—
12% Gel	5678043	5678044	5678045	—	—
18% Gel	5678073	5678074	5678075	5678072	5678071
4–15% Gel	5678083	5678084	5678085	5678082	5678081
4–20% Gel	5678093	5678094	5678095	5678092	5678091
8–16% Linear Gradient	5678103	5678104	5678105	5678102	5678101
10–20% Linear Gradient	5678113	5678114	5678115	5678112	5678111
Any kD Gel	5678123	5678124	5678125	5678122	5678121
Criterion XT Bis-Tris Gels***					
10% Resolving Gel	3450111	3450112	3450113	—	3450115
12% Resolving Gel	3450117	3450118	3450119	3450120†	3450121
4–12% Resolving Gel	3450123	3450124	3450125	3450126†	3450127

continues

Ordering Information

Description	12+2-Well*, ** 45 µl	18-Well 50 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	3450135	3450136†	3450137†	—	—
3–8% Resolving Gel	3450129	3450130	3450131	—	3450133†
Criterion Tris-HCl Gels					
5% Resolving Gel	3450001	3450002	3450003†	—	—
7.5% Resolving Gel	3450005	3450006	3450007	3450008	—
10% Resolving Gel	3450009	3450010	3450011	3450012†	3450101
12.5% Resolving Gel	3450014	3450015	3450016	3450017†	3450102
15% Resolving Gel	3450019	3450020	3450021	3450022†	—
18% Resolving Gel	3450023	3450024	3450025	3450026†	—
4–15% Linear Gradient	3450027	3450028	3450029	3450030†	3450103
4–20% Linear Gradient	3450032	3450033	3450034	3450035	3450104
8–16% Linear Gradient	3450037	3450038	3450039	3450040†	3450105
10–20% Linear Gradient	3450042	3450043	3450044	3450045†	3450107
10.5–14% Linear Gradient	3459949	3459950	3459951	—	3450106
Criterion Stain Free Gels					
10% Tris-HCl Gel	3451012	3451018	—	—	—
4–20% Tris-HCl Gel	3450412	3450418	3450426	—	—
8–16% Tris-HCl Gel	3458162	—	3458166	—	3458161
Criterion Tris-Tricine Gels					
16.5% Tris-Tricine	3450063	3450064	3450065†	3450066†	—
10–20% Tris-Tricine	3450067	3450068	3450069	—	—
Criterion IEF Gels					
pH 3–10	3450071†	3450072†	3450073†	—	—
pH 5–8	—	3450076†	—	—	—
Criterion Zymogram Gels					
10% Zymogram Gel with Gelatin	3450079†	3450080†	3450081†	—	—
12.5% Zymogram Gel with Casein	3450082†	3450083†	3450084†	—	—
Criterion TBE Gels					
5% TBE Gel	3450047	3450048	3450049	—	—
10% TBE Gel	3450051	3450052	3450053	—	—
15% TBE Gel	3450055†	3450056	3450057	—	—
4–20% TBE Gel	3450059†	3450060†	3450061†	—	—
Criterion TBE-Urea Gels					
5% TBE-Urea Gel	—	3450086†	—	—	—
10% TBE-Urea Gel	3450088†	3450089†	3450090†	—	—
15% TBE-Urea Gel	3450091	3450092	3450093†	—	—
Criterion Empty Cassettes					
1.0 mm thick, 10 sets	3459901	3459902	3459903	3459904	3459906
Loading Guides					
Criterion Sample Loading Guide††	1656006	1656007	1656008	—	—

continues

Protein Electrophoresis

Midi-Format 1-D Electrophoresis Systems

www.bio-rad.com/midielectro

Ordering Information

Catalog #	Description
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Criterion XT Buffers and Reagents

1610788***	XT MOPS Running Buffer, 20x, 500 ml
1610789***	XT MES Running Buffer, 20x, 500 ml
1610790	XT Tricine Running Buffer, 20x, 500 ml
1610791	XT Sample Buffer, 4x, 10 ml
1610792	XT Reducing Agent, 20x, 1 ml
1610793***	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
1610796***	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
1610797	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

4110001 **Criterion Precast Gel Application Guide**, available online

* Multichannel pipet compatible. ** Includes reference well(s), 15 µl. *** Purchase of this product is accompanied by a limited license under U.S. patents 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 180.

Criterion Staining Trays

Criterion staining/blotting trays are plastic trays specifically designed for staining one or two Criterion gels or performing western blot detection. 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 excessive 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

* U.S. patent 6,843,593.



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.

- 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)

Stainer Compatibility with Different Gel Sizes

	Gel Size (W x L)	Gel Format
Large Dodeca stainer	25.6 x 23.0 cm 25.0 x 20.5 cm	PROTEAN® Plus precast PROTEAN Plus handcast (requires one attachment per tray)
Small Dodeca stainer	20.0 x 20.5 cm 18.5 x 20.0 cm 18.3 x 19.3 cm 16.0 x 20.0 cm 16.0 x 16.0 cm 13.3 x 8.7 cm	PROTEAN Plus handcast PROTEAN II XL handcast PROTEAN II XL precast PROTEAN II xi handcast PROTEAN II xi handcast and precast 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, SYPRO Ruby protein gel stain, Oriole and Flamingo fluorescent gel stains, 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

Ordering Information

Catalog #	Description
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AnyGel Stands and Accessories

1654131	AnyGel Stand , single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN or Ready Gel mini gels
1655131	AnyGel Stand , 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Mini-PROTEAN or Ready Gel mini gels
1654132	Replacement Clamps , 2

Criterion Staining Trays

3459921	Criterion Staining/Blotting Trays , with lids, 2
3459920	Criterion Staining/Blotting Trays , with lids, 12

Dodeca Stainers, Accessories, and Replacement Parts

1653400	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
1653401	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
1653403	Dodeca Stainer and Dodeca Silver Stain Kit , large, 100–240 V, includes large Dodeca stainer (#1653400), Dodeca silver stain kit for the large tank (#1610480)
1653404	Dodeca Stainer and Dodeca Silver Stain Kit , small, 100–240 V, includes small Dodeca stainer (#1653401), Dodeca silver stain kit for the small tank (#1610481)
1653405	Dodeca Stainer and Bio-Safe Coomassie Stain Kit , large, 100–240 V, includes large Dodeca stainer (#1653400) and staining solution for a large tank, sufficient for up to 12 large format gels
1653406	Dodeca Stainer and Bio-Safe Coomassie Stain Kit , small, 100–240 V, includes small Dodeca stainer (#1653401) and staining solution for a small tank, sufficient for up to 12 large format gels
1653407	Dodeca Stainer and SYPRO Ruby Protein Gel Stain Kit , large, 100–240 V, includes large Dodeca stainer (#1653400) and SYPRO staining solution for a large tank, sufficient for up to 12 large format gels
1653408	Dodeca Stainer and SYPRO Ruby Protein Gel Stain Kit , small, 100–240 V, includes small Dodeca stainer (#1653401) and SYPRO staining solution for a small tank, sufficient for up to 12 large format gels
1653429	Storage Box , large, holds up to 4 gels on large staining trays
1653430	Storage Box , small, holds up to 4 gels on small staining trays
1653416	Dodeca Stainer Tray , small, replacement, 2
1653420	Dodeca Stainer White Development Tray , small
1653422	Dodeca Stainer Shaking Rack , small, replacement
1653423	Dodeca Stainer Solution Tank , large, replacement
1653424	Dodeca Stainer Solution Tank , small, replacement
1653425	Dodeca Stainer Lid with Shaker Motor , 100–240 V, replacement, fits both tank sizes
1653426	Dodeca Stainer Lid without Shaker Motor , replacement, fits both tank sizes
1653428	Dodeca Stainer Shaker Control Unit , replacement

Large-Format Vertical Electrophoresis Systems

See Also

PowerPac Universal and PowerPac HV power supplies: page 167.

PROTEAN i12 IEF cell: page 214.

Protein stains: page 211.

Buffers and reagents for protein electrophoresis: page 204.

Gel clip: page 202.

Dodeca stain: page 194.

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

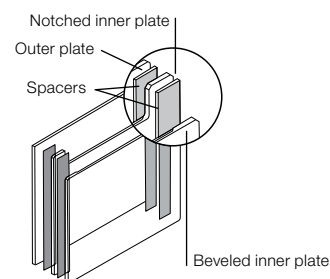
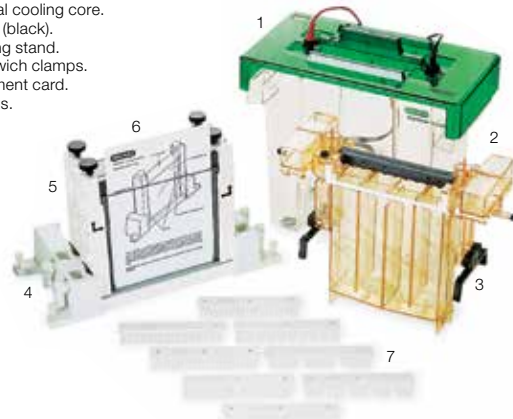
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PROTEAN II Conversion Kits for 2-D Applications

Conversion kits allow you to expand the capabilities of the PROTEAN II xi cell. Choose the PROTEAN II xi cell 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.

* 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 page 165.

Ordering Information

Catalog # Description

PROTEAN II xi Cells, for 16 x 16 cm* Gels

1651801	PROTEAN II xi Cell, without spacers and combs**
1651802	PROTEAN II xi Cell, 1.5 mm spacers (4), 15-well combs (2)
1651803	PROTEAN II xi Cell, 1.0 mm spacers (4), 15-well combs (2)
1651804	PROTEAN II xi Cell, 0.75 mm spacers (4), 15-well combs (2)

PROTEAN II xi Cells, for 16 x 20 cm Gels

1651811	PROTEAN II xi Cell, without spacers and combs**
1651812	PROTEAN II xi Cell, 1.5 mm spacers (4), 15-well combs (2)
1651813	PROTEAN II xi Cell, 1.0 mm spacers (4), 15-well combs (2)
1651814	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

1653188	PROTEAN II XL Cell, wide-format, 1.0 mm, spacers (4), IPG 2-D combs (2)
1653189	PROTEAN II XL Cell, wide-format, 1.5 mm, spacers (4), IPG 2-D combs (2)
1653190	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)***

1651815	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
1653183	PROTEAN II xi Cell IPG Conversion Kit, 1.0 mm spacers
1653186	PROTEAN II xi Cell IPG Conversion Kit, 1.5 mm spacers
1653184	PROTEAN II xi Cell IPG Conversion Kit, 2.0 mm spacers
1651834	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 199.

*** 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.

Protein Electrophoresis

Large-Format Vertical Electrophoresis Systems

www.bio-rad.com/largeelectro

See Also

PowerPac Universal power supply: page 166.

Premixed buffers and buffer reagents: page 204.

Dodeca stainers: page 194.

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.



* Requires a refrigerated circulating bath and operation at 4°C for optimal results.

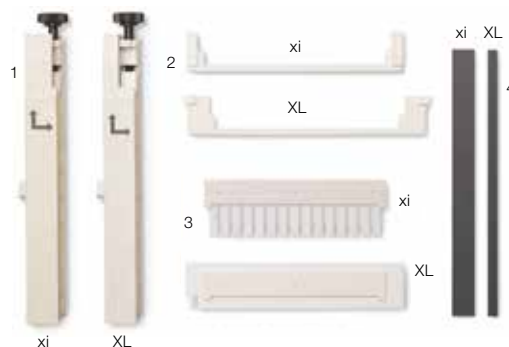
PROTEAN® II xi and XL Accessories

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*

Number or Type of Wells	Well Width	Comb Thickness				
		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.

Ordering Information

Catalog # Description

PROTEAN II xi Accessories for Running Gels

1651901	PROTEAN II xi Sandwich Clamps, 16 cm set (1 left, 1 right)
1651902	PROTEAN II xi Sandwich Clamps, 20 cm set (1 left, 1 right)
1651913	PROTEAN II xi Replacement Gaskets, for central cooling core, 2

PROTEAN II XL Accessories for Running Gels

1651835	PROTEAN II XL Sandwich Clamps, IPG set (1 left, 1 right)
1653182	PROTEAN II XL Replacement Gaskets, for central cooling core, 2

PROTEAN II xi and XL Accessories for Running Gels

1651806	Central Cooling Core, includes 2 gaskets
1651807	Buffer Tank
1651808	Cell Lid, with power cables
1651909	Upper Buffer Dam
1005430	PROTEAN II Latch Assembly Kit, for central cooling core
900768018	Replacement Platinum Wire, cathode, 18"
900768024	Replacement Platinum Wire, anode, 24"

PROTEAN II xi and XL Casting Apparatus

1651911	Slab Gel Casting Stand, with gaskets
1651912	Replacement Gaskets, for casting stand, 2

PROTEAN II xi Glass Plates*

1651821	Inner Plates, for 16 x 16 cm gels, 16 x 20 cm, 2, for PROTEAN II xi cell only
1651822	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

1651825**	Frosted Inner Plates, for agarose gels, 16 x 20 cm, 2, for PROTEAN II xi cell only
1651826**	Frosted Inner Plates, for agarose gels, 20 x 20 cm, 2, for PROTEAN II xi cell only
1651832	Notched Inner Plate, for double-up procedures, 16 x 16 cm gel, 16 cm bevel length, for PROTEAN II xi cell only
1651833	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*

1651823	Inner Plates, 20 x 20 cm, 2
1651824	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
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PROTEAN II xi Spacers (Set of 4)

16 cm gels	1651841	1651842	1651843	1651844	1651845
20 cm gels	1651846	1651847	1651848	1651849	1651850

PROTEAN II xi Combs**

Blank	—	1651891	1651892	1651893	1651894
2-D IPG	—	—	1651897	1651898	1651899
3-Well	—	—	—	1651888	—
5-Well	—	—	1651882	1651883	1651884
10-Well	1651875	1651876	1651877	1651878	1651879
15-Well	1651870	1651871	1651872	1651873	1651874
20-Well	1651865	1651866	1651867	1651868	1651869
25-Well	—	1651861	1651862	1651863	—

Spacer Width	1.0 mm	1.5 mm	2.0 mm
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PROTEAN II XL Combs, IPG Strip Format

2-D IPG (with reference well)	1651838	1651837	1651839
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Catalog # Description

PROTEAN II XL Spacers, IPG Strip Format (Set of 4)

1651836	20 cm Spacers, 1.0 mm
1653181	20 cm Spacers, 1.5 mm
1651837	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 (#1651859).

continues

Protein Electrophoresis

Large-Format Vertical Electrophoresis Systems

www.bio-rad.com/largeelectro

Ordering Information

Catalog #	Description
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PROTEAN II xi Multi-Cell*

1651951	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
1651956	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*, **

1653176	PROTEAN II XL Multi-Cell , wide format, 1.0 mm
1653177	PROTEAN II XL Multi-Cell , wide format, 1.5 mm
1653178	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 page 214.

** Includes catalog #1651951, #1651956, and 3 PROTEAN II xi cell IPG conversion kits of desired thickness. Order appropriate spacers, plates, clamps, combs, and accessories for your application (page 197).

See Also

Acrylamide
gel-casting reagents:
page 207.
Buffers: page 205.

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 202)
- 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



Ordering Information

Catalog #	Description
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1652025	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
1652024	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

1651957	Acrylic Blocks , 4
1651958	Separation Sheets , 15
1652026	Sealing Gaskets , 3
1652029	PROTEAN II xi Alignment Cards , 2
1651840	PROTEAN II XL Alignment Cards , 2

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 $\leq 1^{\circ}\text{C}$
- 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 202) can be used to stabilize and position gels while loading



For More Information
Request or download bulletin: 2621
Web www.bio-rad.com/proteandodeca

* Designed to run IPG and tube gel samples; not recommended for 1-D applications.

** U.S. patent 6,451,193.

See Also

PowerPac HC and PowerPac Universal power supplies: page 167.

Dodeca stainers: page 194.

Gel clip: page 202.

Ordering Information

Catalog # Description

PROTEAN Plus Dodeca Cells and Systems

1654150	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
1654140	PROTEAN Plus Dodeca Cell (100/120 V) and PowerPac HC Power Supply , includes #1654150 and #1645052
1654142	PROTEAN Plus Dodeca Cell (100/120 V) and PowerPac Universal Power Supply , includes #1654150 and #1645070
1654144	PROTEAN Plus Dodeca Cell (100/120 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply , includes #1654150, #1703990, and #1645070
1655134	PROTEAN Plus Dodeca Cell (100/120 V) and Two 6-Row AnyGel Stands , includes #1654150 and two #1655131
1654151	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
1654141	PROTEAN Plus Dodeca Cell (220/240 V) and PowerPac HC Power Supply , includes #1654151 and #1645052
1654143	PROTEAN Plus Dodeca Cell (220/240 V) and PowerPac Universal Power Supply , includes #1654151 and #1645070
1654145	PROTEAN Plus Dodeca Cell (220/240 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply , includes #1654151, #1703990, and #1645070
1655135	PROTEAN Plus Dodeca Cell (220/240 V) and Two 6-Row AnyGel Stands , includes #1654151 and two #1655131

Accessories and Replacement Parts

1654158	Recirculation Pump , 100/120 V
1654159	Recirculation Pump , 220/240 V
1654153	Replacement Tubing Kit , for tank with stopcock drain port installed at base of tank
1654152	Replacement Old Tubing Kit , for tank without stopcock drain port installed at base of tank
1654154	Replacement Gasket Assembly
1654155	Replacement Electrode Card , anode
1654156	Replacement Electrode Card , cathode
1654157	Replacement Lid
1654166	Manifold Tubing , required for precast gels and PROTEAN II plates, 11 pieces
1654167	Buffer Exhaust Tubing
1653320	Gel Releasers , 5
1652948	Replacement Power Cables , for lid

See Also

Acrylamide
gel-casting reagents:
page 207.
Buffers: page 205.

Large-Format Electrophoresis Accessories

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.

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).

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 excessive handling.

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

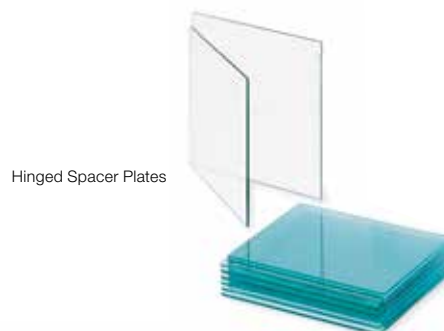
The PROTEAN II xi plate washer/holder takes the tedium out of washing glass plates while greatly reducing the potential for plate damage. Each rack holds up to eight PROTEAN II xi plates or 18 Mini-PROTEAN® II plates. The plate washing tank is ideal for soaking plates and for long-term dust-free storage. Hooks suspend the rack above the washing tank for complete plate drainage.

AnyGel™ Stands

AnyGel stands provide stabilization and access to virtually any size gel. The clamping mechanism secures gel cassettes vertically without excessive 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.



Hinged Spacer Plates



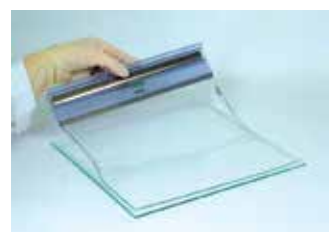
PROTEAN Plus Multi-Casting Chamber



Large Dodeca Stainer



PROTEAN II xi Plate Washer/Holder



Using the gel clip to clamp onto a gel (PROTEAN Plus precast gel shown).

Ordering Information

Catalog # Description

PROTEAN Plus Combs

1654176	2-D Comb with 1 Reference Well, 20 cm, 1.0 mm
1654177	2-D Comb with 1 Reference Well, 20 cm, 1.5 mm
1654178	2-D Comb with 1 Reference Well, 20 cm, 2.0 mm
1654179	2-D Comb with 1 Reference Well, 25 cm, 1.0 mm
1654180	2-D Comb with 1 Reference Well, 25 cm, 1.5 mm
1654181	2-D Comb with 1 Reference Well, 25 cm, 2.0 mm

PROTEAN Plus Hinged Spacer Plates

1654170	Hinged Spacer Plates, for 20 x 20.5 cm gels, 1.0 mm, 1 set
1654171	Hinged Spacer Plates, for 20 x 20.5 cm gels, 1.5 mm, 1 set
1654172	Hinged Spacer Plates, for 20 x 20.5 cm gels, 2.0 mm, 1 set
1654173	Hinged Spacer Plates, for 25 x 20.5 cm gels, 1.0 mm, 1 set
1654174	Hinged Spacer Plates, for 25 x 20.5 cm gels, 1.5 mm, 1 set
1654175	Hinged Spacer Plates, for 25 x 20.5 cm gels, 2.0 mm, 1 set

PROTEAN Plus Multi-Casting Chamber

1654160	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)
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Accessories for PROTEAN Plus Multi-Casting Chamber

1654165	Separation Sheets, for PROTEAN Plus multi-casting chamber, 15
1654161	Acrylic Block, 1.5 mm
1654162	Acrylic Block, 3 mm
1654163	Acrylic Block, 6 mm
1654164	Acrylic Block, 12 mm
1653320	Gel Releasers, 5

Gel Clip

1653414	Gel Clip, holds any gel size
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Model 495 Gradient Former

1654121	Model 495 Gradient Former, 100–1,500 ml, includes body with valve stem and tubing connection kit
1654123	Model 495 Gradient Former and PROTEAN Plus Multi-Casting Chamber, includes #1654121 and #1654160

Accessories for Model 495 Gradient Former

1652005	Exponential Piston, for Model 395 and Model 495 gradient formers
1652008	Tubing Connection Kit, includes stopcock, luer taper coupling, tubing (1/8" ID, 3'), Y-connector

PROTEAN II xi Plate Washer/Holder

1651991*	PROTEAN II xi Plate Washer System, includes 2 plate holders, washing tank, lid, 1 bottle of Bio-Rad cleaning concentrate
1651992*	PROTEAN II xi Plate Holder
1610722	Bio-Rad Cleaning Concentrate, 50x, 1 kg

* Not compatible with Mini-PROTEAN 3 short plates and spacer plates or with PROTEAN Plus hinged spacer plates.

Buffers and Reagents for Protein Electrophoresis

See Also

ReadyPrep
2-D sample
preparation kits:
page 3.

ReadyStrip
IPG strips:
page 217.

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

1610737	2x Laemmli Sample Buffer , 30 ml
1610747	4x Laemmli Sample Buffer , 10 ml
1610738	Native Sample Buffer , 30 ml
1610739	Tricine Sample Buffer , 30 ml
1610763	IEF Sample Buffer , 30 ml
1610764	Zymogram Sample Buffer , 30 ml
1610791	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 193.



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	Catalog #	Description
Premixed Protein Running Buffers		Premixed Nucleic Acid Running Buffers	
1610732	10x Tris/Glycine/SDS, 1 L	1610733	10x Tris/Boric Acid/EDTA (TBE), 1 L
1610772	10x Tris/Glycine/SDS, 5 L cube	1610770	10x Tris/Boric Acid/EDTA (TBE), 5 L cube
1610734	10x Tris/Glycine, 1 L	1610741	10x Tris/Boric Acid/EDTA (TBE), extended range, 1 L
1610771	10x Tris/Glycine, 5 L cube	1610743	50x Tris/Acetic Acid/EDTA (TAE), 1 L
1610744	10x Tris/Tricine/SDS, 1 L		
1610761	10x IEF Anode Buffer, 250 ml		
1610762	10x IEF Cathode Buffer, 250 ml		
1610765	10x Zymogram Renaturation Buffer, 125 ml		
1610766	10x Zymogram Development Buffer, 125 ml		

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
1610798	Resolving Gel Buffer, 1.5 M Tris-HCl, pH 8.8, 1 L
1610799	Stacking Gel Buffer, 0.5 M Tris-HCl, pH 6.8, 1 L

See Also

ReadyStrip IPG strips: page 217.

Vertical electrophoresis: page 176.

Horizontal electrophoresis: page 256.

TGX Stain-Free™ Solutions

TGX™ Handcast Acrylamide Solutions

TGX Stain-Free™ FastCast™ Acrylamide Solutions

TGX Stain-Free FastCast acrylamide solutions are ready-to-use solutions for hand casting polyacrylamide gels for SDS-PAGE or PAGE. Stain-free technology eliminates extra steps by confirming electrophoresis results and transfer performance before western blotting, conserving precious samples, and reducing waste. Each kit comes with two resolver and stacker solutions, which are each mixed 1:1 with the appropriate amount of TEMED and APS.

TGX™ FastCast™ Acrylamide Solutions

TGX FastCast acrylamide solutions are ready-to-use solutions for hand casting polyacrylamide gels for SDS-PAGE or PAGE. Each kit comes with two resolver and stacker solutions, which are each mixed 1:1 with the appropriate amount of TEMED and APS.

Advantages of the TGX and TGX Stain-Free FastCast acrylamide kits:

- **Faster casting times** — ability to pour stacker immediately after resolver
- **Long shelf life gels** — gels can be used up to 1 month after casting when stored at 4°C
- **Fast run times** — run times in as little as 20 min



- **Fast blotting times** — efficient protein transfers in as little as 3 min using the Trans-Blot® Turbo™ transfer system
- **Stain-free technology** — for fast imaging or for better, more reliable total protein normalization in western blotting (using Stain-Free FastCast kits and Bio-Rad stain-free enabled imagers)

For More Information

Web: www.bio-rad.com/tgxfastcast
www.bio-rad.com/tgxstainfreefastcast

Approximate Number of Gels per Kit

	Mini Gels (~9 x 7 cm)				Midi Gels (~13 x 9 cm)
	1.0 mm MiniPROTEAN® Cassettes	0.75 mm Glass Plates	1.0 mm Glass Plates	1.5 mm Glass Plates	1.0 mm Criterion® Cassettes
Starter Kit	11 gels	19 gels	13 gels	9 gels	6 gels
11 gels	55 gels	95 gels	65 gels	45 gels	30 gels

Ordering Information

Catalog #	Description
1610170	TGX FastCast Acrylamide Starter Kit, 7.5%
1610171	TGX FastCast Acrylamide Kit, 7.5%
1610172	TGX FastCast Acrylamide Starter Kit, 10%
1610173	TGX FastCast Acrylamide Kit, 10%
1610174	TGX FastCast Acrylamide Starter Kit, 12%
1610175	TGX FastCast Acrylamide Kit, 12%
1610180	TGX Stain-Free FastCast Acrylamide Starter Kit, 7.5%
1610181	TGX Stain-Free FastCast Acrylamide Kit, 7.5%
1610182	TGX Stain-Free FastCast Acrylamide Starter Kit, 10%
1610183	TGX Stain-Free FastCast Acrylamide Kit, 10%
1610184	TGX Stain-Free FastCast Acrylamide Starter Kit, 12%
1610185	TGX Stain-Free FastCast Acrylamide Kit, 12%

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).

$$\%T = \frac{\text{grams acrylamide} + \text{grams cross-linker}}{\text{total volume, ml}} \times 100\%$$

$$\%C = \frac{\text{grams cross-linker}}{\text{grams acrylamide} + \text{grams cross-linker}} \times 100\%$$

By varying these two parameters, the pore size of the gel can be optimized to give the best separation and resolution for



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

the molecule of interest. For help in determining the best %T and %C for your application, refer to the Precast Gels section on page 180. Examples of migration patterns of proteins on gels of different compositions can be found on page 181 (Mini-PROTEAN® TGX™ precast gels) and 190 (Criterion™ precast gels), or contact Bio-Rad Technical Support.

For More Information

Web: www.bio-rad.com/acrylamide

Request or download bulletins: 1156 and 1866

Ordering Information

Description

Acrylamide Solutions*	500 ml	2 x 500 ml
30% acrylamide/bis, 19:1	1610154	1610155
30% acrylamide/bis, 29:1	1610156	1610157
30% acrylamide/bis, 37.5:1	1610158	1610159
40% acrylamide/bis, 19:1	1610144	1610145
40% acrylamide/bis, 29:1	1610146	1610147
40% acrylamide/bis, 37.5:1	1610148	1610149
40% acrylamide	1610140	1610141
2% bis solution	1610142	1610143

Catalog # Description

Acrylamide Powder

1610100	Acrylamide, 99.9%, 100 g
1610101	Acrylamide, 99.9%, 500 g
1610107	Acrylamide, 99.9%, 1 kg
1610103	Acrylamide, 99.9%, 2 kg
1610108	Acrylamide, 99.9%, 5 kg

Premixed Acrylamide/Bis Powders	30 g	150 g
Acrylamide/bis, 19:1	1610120	1610123
Acrylamide/bis, 29:1	1610121	1610124
Acrylamide/bis, 37.5:1	1610122	1610125

Catalog # Description

1615100	SDS-PAGE Reagent Starter Kit, includes 100 g acrylamide, 5 g bis, 5 ml TEMED, 10 g ammonium persulfate
1632091	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.

Protein Electrophoresis

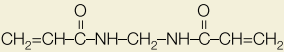
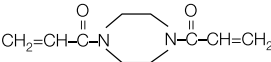
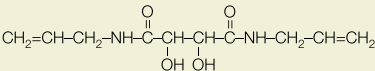
Buffers and Reagents for Protein Electrophoresis

www.bio-rad.com/proteinreagents

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

1610200 **Bis Crosslinker**, 5 g
 1610201 **Bis Crosslinker**, 50 g
 1610142 **2% Bis Solution**, 500 ml
 1610143 **2% Bis Solution**, 2 x 500 ml
 1610202 **PDA Crosslinker**, 10 g
 1610620 **DATD Crosslinker**, 25 g

Catalysts

1610800 **TEMED***, 5 ml (hazardous shipping charges may apply)
 1610801 **TEMED**, 50 ml
 1610700 **Ammonium Persulfate (APS)***, 10 g
 1610501 **Riboflavin-5'-Phosphate***, 10 g

* For longer shelf life, store desiccated at room temperature.

IEP/IEF Agaroses

Standard low α _r agarose — with high strength, clarity, and low α _r value, this agarose is recommended for all standard immunoelectrophoresis applications.

Zero α _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/IEP/IEFAgaroses

Ordering Information

Catalog #	Description
1620100	Standard Low –m, Agarose , 100 g
1620102	Standard Low –m, Agarose , 500 g
1620022	Zero –m, 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
1610404	Bromophenol Blue , 10 g
1610423	Xylene Cyanole FF , 25 g

All dyes and stains should be stored at room temperature, dry, and away from direct sunlight.

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.

See Also

ReadyPrep
2-D sample
preparation kits:
page 4.

Ordering Information

Catalog #	Description
1610301	SDS (Sodium Dodecyl Sulfate) , 100 g
1610302	SDS (Sodium Dodecyl Sulfate) , 1 kg
1610416	SDS Solution , 10% (w/v), 250 ml
1610418	SDS Solution , 20% (w/v), 1 L
1706531	Tween 20 , EIA grade, 100 ml
1610407	Triton X-100 Detergent , 500 ml
1610460	CHAPS* , 1 g
1610781	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.

Protein Electrophoresis

Buffers and Reagents for Protein Electrophoresis

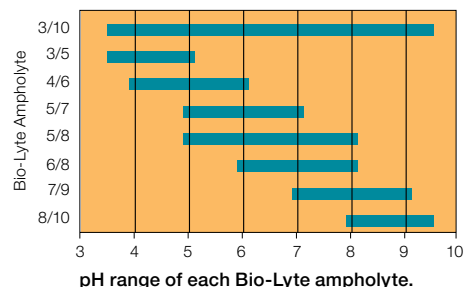
www.bio-rad.com/proteinreagents

See Also

ReadyStrip IPG strips:
page 217.
PROTEAN i12 IEF
system:
page 214.

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 218).



Ordering Information

Catalog #	Description	Catalog #	Description
1631112	Bio-Lyte 3/10 Ampholyte, 40%, 10 ml	1631192	Bio-Lyte Ampholyte, 40%, 10 ml
1631113	Bio-Lyte 3/10 Ampholyte, 40%, 25 ml	1631193	Bio-Lyte 5/8 Ampholyte, 40%, 25 ml
1631132	Bio-Lyte 3/5 Ampholyte, 20%, 10 ml	1631162	Bio-Lyte 6/8 Ampholyte, 40%, 10 ml
1631142	Bio-Lyte 4/6 Ampholyte, 40%, 10 ml	1631163	Bio-Lyte 6/8 Ampholyte, 40%, 25 ml
1631143	Bio-Lyte 4/6 Ampholyte, 40%, 25 ml	1631172	Bio-Lyte 7/9 Ampholyte, 40%, 10 ml
1631152	Bio-Lyte 5/7 Ampholyte, 40%, 10 ml	1631182	Bio-Lyte 8/10 Ampholyte, 20%, 10 ml
1631153	Bio-Lyte 5/7 Ampholyte, 40%, 25 ml		

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
1610722	Bio-Rad Cleaning Concentrate, 50x, 1 kg

See Also

Gel drying systems:
page 230.

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
1610752	Gel Drying Solution, 1 L

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			
QC Colloidal Coomassie	3.0 ng	1–20 hr	Colloidal endpoint stain; nonhazardous formulation
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; compatible only 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	50.0 ng	1 hr	Classic fluorescent DNA stain

Coomassie Stains

QC Colloidal Coomassie Stain

The QC colloidal Coomassie stain provides sensitivity down to ~3 ng BSA, low background endpoint staining, and the level of reproducibility needed to meet regulatory standards. Additionally, it is formulated to be ready to use and environmentally friendly. Features include:

- Low background, high sensitivity, superior reproducibility
- Environmentally friendly formulation — no addition of methanol or acetic acid required; eliminates the need for hazardous waste disposal
- Flexible staining and destaining times — from 1 hr to overnight
- No alcohol addition or dilution steps necessary when staining polyacrylamide gels
- One-part, ready-to-use colloidal Coomassie stain

For More Information

Web: www.bio-rad.com/coomassie
Request or download bulletin: 6385

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.



QC Colloidal Coomassie Stain



Coomassie Brilliant Blue R-250

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

See Also

Precast polyacrylamide gels: page 180, 189.
Imaging systems: page 290.

Protein Electrophoresis

Protein Stains

www.bio-rad.com/proteinstains

Ordering Information

Catalog #	Description
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QC Colloidal Coomassie Stain

1610803	QC Colloidal Coomassie Stain, 1 L
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Bio-Safe Coomassie Stain

1610786	Bio-Safe Coomassie Stain, 1 L
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1610787	Bio-Safe Coomassie Stain, 5 L
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Coomassie Brilliant Blue R-250 Staining and Destaining Solutions

1610435	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
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1610436	Coomassie Brilliant Blue R-250 Staining Solution, 1 L
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1610437	Coomassie Brilliant Blue R-250 Staining Solution, 4 x 1 L
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1610438	Coomassie Brilliant Blue R-250 Destaining Solution, 1 L
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1610439	Coomassie Brilliant Blue R-250 Destaining Solution, 4 x 1 L
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Coomassie Stain Powders

1610400	Coomassie Brilliant Blue R-250, 10 g
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1610406	Coomassie Brilliant Blue G-250, 10 g
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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

	Silver Stain Plus	Silver Stain
Time	1.5 hr	2 hr
Number of Gels	40 mini gels	48 mini gels
Shelf Life	1 yr	1 yr
Storage	4°C	Ambient
Lowest Sensitivity	0.6–1.2 ng	0.6–1.2 ng

Ordering Information

Catalog #	Description
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Silver Stain Plus Kit

1610449	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
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1610448	Development Accelerator Reagent, 50 g
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1610461	Fixative Enhancer Concentrate*, 1 L
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1610462	Silver Complex Solution*, 100 ml
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1610463	Reduction Moderator Solution*, 100 ml
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1610464	Image Development Reagent*, 100 ml
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* Hazardous shipping charges may apply.

Ordering Information

Catalog #	Description
Bio-Rad Silver Stain Kit*, **	
1610443	Silver Stain Kit , includes oxidizer concentrate, silver reagent concentrate, silver stain developer, stains 20 full-size or 48 mini gels
1610450	Silver Stain Developer , 115 g
1610447	Silver Stain Developer , 4 x 115 g
1610444	Oxidizer Concentrate , 480 ml
1610445	Silver Reagent Concentrate , 480 ml

* Hazardous shipping charges may apply.

** The Bio-Rad silver stain kit and components should be stored at 4°C.

Fluorescent Stains**Oriole™ Fluorescent Gel Stain**

Oriole stain is an easy-to-use, fast, and sensitive fluorescent protein gel stain.

- One-step protocol, no fixing or destaining required, full sensitivity achieved 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

Flamingo™ Fluorescent Gel Stain

This easy-to-use, economical gel stain is for use with the ChemiDoc MP 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

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

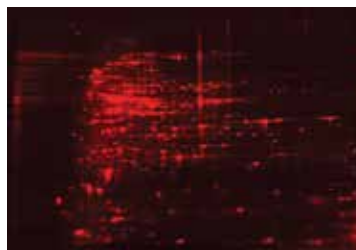
For More Information

Web: www.bio-rad.com/fluorescentstain

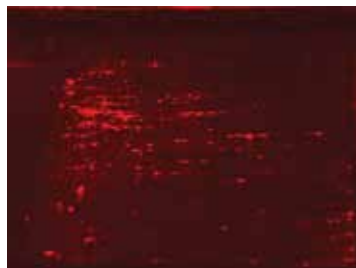
Request or download bulletins: Flamingo - 5346, 5705, 5754 and Oriole - 5900, 5991, 5921



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. *E. coli* protein sample (10 µg).



SYPRO Ruby protein gel stain. *E. coli* protein sample (10 µg).

See Also

Imaging systems:
page 290.

Precast
polyacrylamide gels:
page 180, 189.

2-D electrophoresis:
page 214.

Ordering Information

Catalog # Description

Oriole Fluorescent Gel Stain

1610495	Oriole Fluorescent Gel Stain, 1x solution, 200 ml
1610496	Oriole Fluorescent Gel Stain, 1x solution, 1 L
1610497	Oriole Fluorescent Gel Stain, 1x solution, 5 L

Flamingo Fluorescent Gel Stain


1610490	Flamingo Fluorescent Gel Stain, 10x solution, 20 ml
1610491	Flamingo Fluorescent Gel Stain, 10x solution, 100 ml
1610492	Flamingo Fluorescent Gel Stain, 10x solution, 500 ml

SYPRO Ruby Protein Gel Stain

1703126	SYPRO Ruby Protein Gel Stain, 1x solution, 200 ml
1703125	SYPRO Ruby Protein Gel Stain, 1x solution, 1 L
1703138	SYPRO Ruby Protein Gel Stain, 1x solution, 5 L

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 page 163. For preparative IEF products see page 225.

 **Learn More about the Technology**
Web: www.bio-rad.com/tech/2delectro

For More Information
Web: www.bio-rad.com/2dworkflow

See Also

ReadyStrip IPG strips:
page 217.

Protein sample preparation products:
page 2.

Vertical electrophoresis:
page 176.

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



PROTEAN i12 IEF system touch screen user interface.

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

**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.

Web Application

- Export focusing data via USB port to an Excel spreadsheet 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 InformationWeb: www.bio-rad.com/proteani12

Request or download bulletins: 2651, 6097, 6138, 6139, and 6140

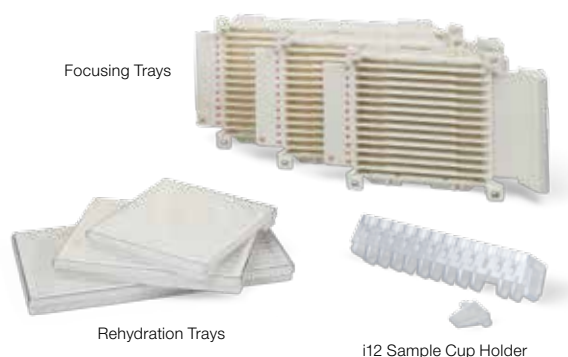
PROTEAN i12 IEF System Specifications

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 μ A, 1 μ A 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

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

Ordering Information

Catalog #	Description
1646000	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
1646001	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

1646107	i12 7 cm Focusing Tray , includes 2 IPG strip retainers
1646111	i12 11 cm Focusing Tray , includes 2 IPG strip retainers
1646113	i12 13 cm Focusing Tray , includes 2 IPG strip retainers
1646117	i12 17 cm Focusing Tray , includes 2 IPG strip retainers
1646118	i12 18 cm Focusing Tray , includes 2 IPG strip retainers
1646124	i12 24 cm Focusing Tray , includes 2 IPG strip retainers
1654035	i12 7 cm Rehydration/Equilibration Tray , includes lids, 25
1654025	i12 11 cm Rehydration/Equilibration Tray , includes lids, 25
1646313	i12 13 cm Rehydration/Equilibration Tray , includes lids, 25
1654015	i12 17 cm Rehydration/Equilibration Tray , includes lids, 25
1654041	i12 18 cm Rehydration/Equilibration Tray , includes lids, 25
1654043	i12 24 cm Rehydration/Equilibration Tray , includes lids, 25
1646040	IPG Strip Retainers , 2
1646020	i12 Sample Cup Holder , includes 25 sample cups
1646021	i12 Sample Cups , 25
1646030	Gel-Side Up Electrode Wicks , 100

continues

Ordering Information

Catalog #	Description
PROTEAN i12 IEF System Accessories (cont.)	
1646031	Gel-Side Down Electrode Wicks, 500
1646012	Negative Electrode Assembly
1646011	Positive Electrode Assembly
1646010	Electrode Assembly Pair, includes 1 positive and 1 negative electrode assembly
1654072	Cleaning Brushes, 2
1610722	Cleaning Concentrate, 1 L
1646060	USB Flash Drive, 2
1646050	Stylus, 3
1632129	Mineral Oil, 500 ml
1654070	Forceps, 1

PROTEAN® IEF Accessories

Accessories for the discontinued PROTEAN IEF cell (#1654000 and #1654001) 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 215 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



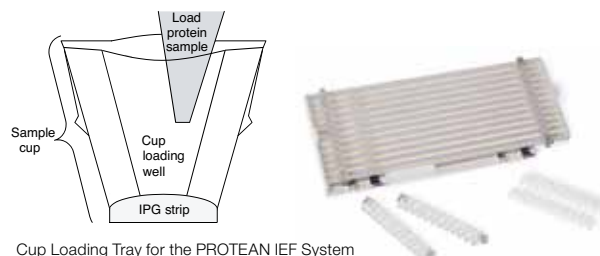
Focusing Tray for the PROTEAN IEF System

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	
1654030	7 cm Focusing Tray with Lid
1654020	11 cm Focusing Tray with Lid
1654010	17 cm Focusing Tray with Lid
1654040	18 cm Focusing Tray with Lid
1654042	24 cm Focusing Tray with Lid
Cup Loading Tray*	
1654050	Cup Loading Tray, includes 1 tray base, 1 pair movable electrodes, 1 pack each of large and small replacement cups
1654055	Cup Loading Tray with Forceps
Accessories	
1654071	Electrode Wicks, precut, 500
1654080	Thermal Printer, 100 V, includes cable and power adaptor
1702412	Thermal Printer Paper, 10 rolls
1654051	Large Replacement Cups, 150 µl, 120
1654052	Small Replacement Cups, 100 µl, 120
1654053	Replacement Movable Electrodes, 1 pair
1654054	Replacement Cup Loading Tray Base

Trays

1654030	7 cm Focusing Tray with Lid
1654020	11 cm Focusing Tray with Lid
1654010	17 cm Focusing Tray with Lid
1654040	18 cm Focusing Tray with Lid
1654042	24 cm Focusing Tray with Lid

Cup Loading Tray*

1654050	Cup Loading Tray, includes 1 tray base, 1 pair movable electrodes, 1 pack each of large and small replacement cups
1654055	Cup Loading Tray with Forceps

Accessories

1654071	Electrode Wicks, precut, 500
1654080	Thermal Printer, 100 V, includes cable and power adaptor
1702412	Thermal Printer Paper, 10 rolls
1654051	Large Replacement Cups, 150 µl, 120
1654052	Small Replacement Cups, 100 µl, 120
1654053	Replacement Movable Electrodes, 1 pair
1654054	Replacement Cup Loading Tray Base

* 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.

ReadyStrip™ IPG Strips

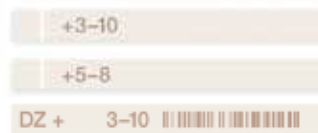
ReadyStrip IPG strips are available in five different strip lengths and in a wide selection of pH gradients, with 1, 3, or 7 pH units per strip. Shorter strips are useful for method development, while longer strips provide the best separation possible with higher protein loads. ReadyStrip IPG strips 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 barcoding 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)
- 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 barcode 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 lengths** — 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

See Also







PROTEAN i12 IEF system: page 214.
ReadyPrep 2-D starter kit: page 219.

Protein Electrophoresis

2-D Electrophoresis

www.bio-rad.com/2Dsystems

Relative Focusing Power of IPG Strips

Strip Range*	pH									Relative Focusing Power					ReadyStrip IEF Buffer	
	3	4	5	6	7	8	9	10	7 cm	11 cm	17 cm	18 cm	24 cm	3-10	7-10	
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	●	

* 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	1632000	1632014	1632007	1632032	1632042
pH 3-10 NL*	1632002	1632016	1632009	1632033	1632043
pH 3-6	1632003	1632017	1632010	1632035	1632045
pH 4-7	1632001	1632015	1632008	1632034	1632044
pH 5-8	1632004	1632018	1632011	1632036	1632046
pH 7-10	1632005	1632019	1632012	1632037	1632047

ReadyStrip IEF Buffers** and Accessories

1632094	Bio-Lyte 3/10 Ampholyte, 100x, 1 ml
1632093	ReadyStrip 100x 7-10 Buffer, includes only ampholytes, 1 ml
1632099	ReadyStrip Instruction Manual, free upon request with ReadyStrip purchases

* 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 page 3.

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

This kit contains enough material to complete either six 17 cm IPG strips, ten 11 cm strips, or sixteen 7 cm IPG strips.

For More Information

Web: www.bio-rad.com/readyprep2d



2-D Starter Kit Contents

	Vials/Kit
<i>E. coli</i> 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

See Also

ReadyStrip IPG strips and IEF buffers: page 217.
PROTEAN i12 IEF system: page 214.
Criterion system: page 187.

Ordering Information

Catalog #	Description
1632105	ReadyPrep 2-D Starter Kit , includes <i>E. coli</i> protein sample and reagents sufficient to rehydrate, focus, and transfer to second-dimension gels, ReadyStrip IPG strips, precast SDS-PAGE gels, and gel stains not included
1632110	<i>E. coli</i> Protein Sample , lyophilized, 2.7 mg

See Also

Protein sample
preparation products:
page 2.
ReadyPrep reduction-
alkylation kit:
page 4.

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 4.

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 perpendicular 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

Ordering Information

Catalog #	Description
1632106	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
1632107	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
1632108	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
1632091	ReadyPrep Proteomics Grade Water , 500 ml
1610610	Dithiothreitol (DTT) , 1 g
1610611	Dithiothreitol (DTT) , 5 g
1632101	Tributylphosphine (TBP) , 200 mM, 0.6 ml
1632109	Iodoacetamide , 30 g
1610731	Urea , 1 kg
1610719	Tris , 1 kg
Control Sample	
1632110	<i>E. coli</i> Protein Sample , lyophilized, 2.7 mg
Overlay Agaroses	
1632111	ReadyPrep Proteomics Grade Overlay Agarose , 50 ml, 0.5% low melting point agarose in 1x Tris/glycine/SDS and 0.003% bromophenol blue
1632092	PROTEAN Plus Proteomics Grade Overlay Agarose , 125 ml, 0.75% agarose in 1x Tris/glycine/SDS and 0.003% bromophenol blue
Detergent for IEF	
1610460	CHAPS , 1 g

Control Sample

Overlay Agaroses

Detergent for IEF

Tube Gel IEF 2-D Systems

Bio-Rad offers several options for first-dimension tube gel separations using ampholytes.

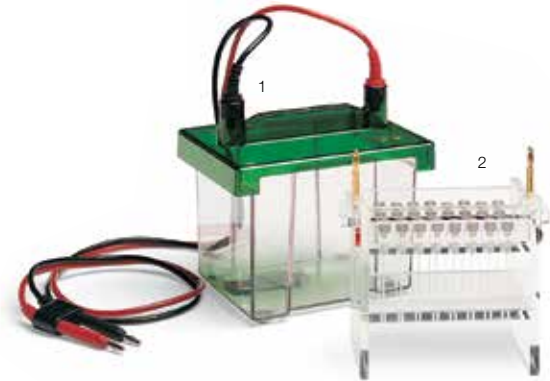
Mini-PROTEAN® 2-D Electrophoresis Cell

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/tubegellief



Mini-PROTEAN 2-D electrophoresis cell components:
1. Buffer tank and lid with cables.
2. Tube cell module.

See Also

AnyGel stands:
page 185.
PowerPac HV and
PowerPac Universal
power supplies:
page 167.
Acrylamide
gel-casting reagents:
page 207.

Ordering Information

Catalog #	Description
1652960	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
1652961	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
1652965*	Mini-PROTEAN Tube Cell Module , same as #1652961, without lower buffer chamber and lid

Accessories

1652966	Capillary Tubes with Casting Tube , 200
1652967	Mini 2-D Tube Gel Ejector
1652968	Mini-PROTEAN Tube Gel Sample Reservoirs , 8
1652969	Mini-PROTEAN Tube Module Stoppers , 8
1652970	Mini-PROTEAN Tube Module Tube Connectors , 50
1645056**	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.

Protein Electrophoresis

2-D Electrophoresis

www.bio-rad.com/2Dsystems

See Also

PowerPac HV and PowerPac Universal power supplies: page 167.

Acrylamide gel-casting reagents: page 207.

PROTEAN II second-dimension systems: page 196.

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/tubegellIEF



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
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PROTEAN II xi 2-D Tube Gel Cell*

1651931	PROTEAN II xi 2-D Cell, 1.0 mm, 16 cm
1651932	PROTEAN II xi 2-D Cell, 1.5 mm, 16 cm
1651933	PROTEAN II xi 2-D Cell, 1.0 mm, 20 cm
1651934	PROTEAN II xi 2-D Cell, 1.5 mm, 20 cm

Accessories and Replacement Parts

1651940	Tube Gel Adaptor, with gasket, grommets (4–8 mm OD tubes), stoppers
1651943	Tube Gel Loading Needles, 18 cm, 22 gauge, blunt tip, luer hub (for casting monomer in small-diameter tubes), 2
1651944	Tube Gel Extrusion Needles, 9 cm, 26 gauge, beveled tip, luer hub (for removing gels from tubes), 2
1651947	Replacement Gaskets, for tube gel adaptor, 2
1651859	PROTEAN II Comb Conversion Screws**, includes 10 comb conversion screws, 10 standard comb screws
1651827	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
1651828	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.

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.

For More Information

Web: www.bio-rad.com/model175



Glass Tubes



Model 225 Tube Gel Casting Stand

See Also

PowerPac HV and PowerPac Universal power supplies: page 167.

PROTEAN II xi multi-cell: page 198.

Bio-Lyte ampholytes: page 210.

Acrylamide gel-casting reagents: page 207.

Ordering Information

Catalog #	Description
Glass Tubes	
1653136	1.0 mm ID Glass Tubes, 6.0 mm OD, 180 mm length, 24
1653137	1.5 mm ID Glass Tubes, 7.5 mm OD, 150 mm length, 24
1653138	1.5 mm ID Glass Tubes, 7.5 mm OD, 180 mm length, 24
1653155	2.4 mm ID Glass Tubes, 4.0 mm OD, 160 mm length, 24
1653150	3.4 mm ID Glass Tubes, 5.0 mm OD, 125 mm length, 24
1653122	5.0 mm ID Glass Tubes, 7.0 mm OD, 125 mm length, 24
Model 225 Tube Gel Casting Stand	
1652020	Model 225 Tube Gel Casting Stand
Grommet and Stopper Sets*	
1651984	Grommets and Stoppers, for 4–5 mm OD tubes, 12 each
1651985	Grommets and Stoppers, for 6–7.5 mm OD tubes, 12 each

Glass Tubes

1653136	1.0 mm ID Glass Tubes, 6.0 mm OD, 180 mm length, 24
1653137	1.5 mm ID Glass Tubes, 7.5 mm OD, 150 mm length, 24
1653138	1.5 mm ID Glass Tubes, 7.5 mm OD, 180 mm length, 24
1653155	2.4 mm ID Glass Tubes, 4.0 mm OD, 160 mm length, 24
1653150	3.4 mm ID Glass Tubes, 5.0 mm OD, 125 mm length, 24
1653122	5.0 mm ID Glass Tubes, 7.0 mm OD, 125 mm length, 24

Model 225 Tube Gel Casting Stand

1652020	Model 225 Tube Gel Casting Stand
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Grommet and Stopper Sets*

1651984	Grommets and Stoppers, for 4–5 mm OD tubes, 12 each
1651985	Grommets and Stoppers, for 6–7.5 mm OD tubes, 12 each

* Grommet and stopper sets work with both Model 175 and Model 225 tube gels and the tube gel adaptors for the PROTEAN II xi cells.

Mini-Format Analytical IEF

See Also

PowerPac HV and
PowerPac Universal
power supplies:
page 167.

IEF standards:
page 175.

Bio-Lyte ampholytes:
page 210.

Acrylamide
gel-casting reagents:
page 207.

Agarose:
page 208.

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 requires only 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
1702975	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

1702980	Graphite Electrodes , 2
1702981	Mini Casting Tray
1702982	Glass Plates , 12.5 cm x 6.5 cm x 1.5 mm, 5
1702983	Gel Support Film for Polyacrylamide , 12.5 x 6.5 cm, 50 sheets
1702984	Gel Support Film for Agarose , 12.5 x 6.5 cm, 50 sheets
1702985	Sample Templates , 5

Preparative Electrophoresis

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:

- **Model 491 prep cell and mini prep cell** — perform high-resolution separations of proteins and nucleic acids by continuous-elution gel electrophoresis (PAGE)
- **Model 422 electro-eluter** — elutes macromolecules from gel slices

See Also

Protein sample preparation kits: page 2.

Preparative Electrophoresis Product Selection Guide

Product	Page	Method of Purification	Molecules Purified	Run Time	Bulletin
Model 491 prep cell	227	SDS-PAGE or native PAGE	Protein (1–500 mg) DNA (50–300 µg) RNA (≤1 mg)	4–10 hr	1964
Mini prep cell	227	SDS-PAGE or native PAGE	Protein (0.5–1,000 µg) DNA (≤10 µg) RNA (≤20 µg)	4–10 hr	1964
Model 422 electro-eluter	229	Electroelution from excised gel pieces	Protein (gel load limits) DNA (≤3 mm thick gels)	3–5 hr	—

See Also

PowerPac HV
power supply:
page 167.

Protein sample
preparation kits:
page 2.

Rotofor Cell, Mini Rotofor Cell Accessories, and MicroRotofor®
Ordering Information

Catalog #	Description
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Accessories and Replacement Parts for Rotofor Cell and Mini Rotofor Cell

1702910	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
1702991	Mini Membrane Cores , for 18 ml focusing chamber, 2
1702952	Membrane Cores , for 60 ml focusing chamber, 2
1702953	Repair Kit , includes O-ring kit, 4 ion exchange gaskets, 4 port cover screws, 4 electrolyte chamber screws, 2 gray port gaskets
1702954	Cooling Finger O-Ring Kit , with 4 O-rings
1702956	Ion Exchange Membranes , 5 pair
1702957	Vent Buttons , 8
1702958	Cooling Finger
1702960	Sealing Tape , 1 roll, 1 in x 36 yards
1702964	Harvest Tubing
1702965	Harvest Box Lid
1702966	Harvesting Needle Array

Rotofor Adaptor Kits

1702990	Adaptor Kit , to convert Rotofor cell to mini Rotofor cell, includes mini focusing chamber, mini membrane core, 18 ml
1702959	Adaptor Kit , to convert mini Rotofor cell to Rotofor cell, includes focusing chamber, membrane core, 60 ml

Accessories and Replacement Parts for MicroRotofor Cell

1702804	MicroRotofor Starter Kit , includes Bio-Lyte ampholytes, control protein sample, focusing chamber, ion exchange membranes, harvesting tray, syringes
1702810	MicroRotofor Harvesting Trays , 3
1702820	MicroRotofor Sealing Film , 10 sheets
1702960	Sealing Tape , 1 roll, 1 in x 36 yards
1702821	MicroRotofor Focusing Chambers , 3
1702822	MicroRotofor Cathode Assembly
1702829	MicroRotofor Anode Assembly
1702832	MicroRotofor Assembly Tool
1702833	MicroRotofor Ion Exchange Membrane Assemblies
1702835	MicroRotofor Cleaning Brush
1702836	MicroRotofor Syringes , 3 and 10 ml, 3 each
1702850	MicroRotofor Harvesting Station , includes alignment station, needle assembly, needle holder
1702851	MicroRotofor Needle Assembly
1702852	MicroRotofor Vacuum Block O-Ring
1702855	MicroRotofor Lid
1702826	MicroRotofor Electrode Assembly O-Ring/Gasket Kit , electrolyte buffer chamber O-ring and gaskets

Preparative PAGE Cells

Model 491 Prep Cell and Mini Prep Cell

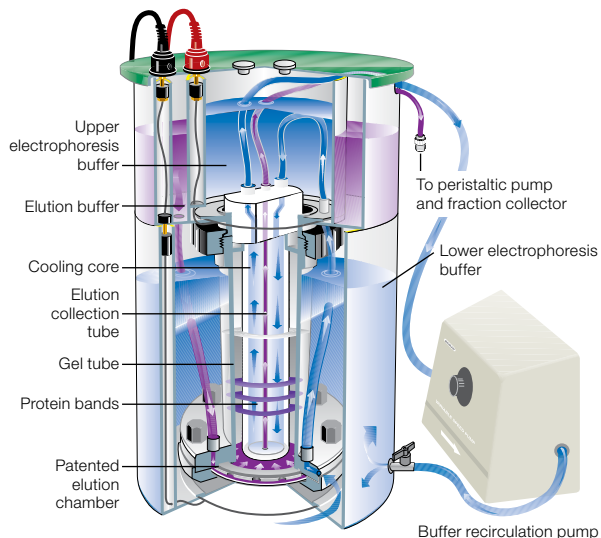
The Model 491 prep cell and mini prep cells separate biomolecules (protein or nucleic acids) by continuous-elution electrophoresis. Samples are electrophoresed through a cylindrical gel matrix, where they are separated into ring-shaped bands. As individual bands migrate off the bottom of the gel, they 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



See Also

PowerPac Universal and PowerPac HV power supplies: page 167.

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.

Protein Electrophoresis

Preparative Electrophoresis

www.bio-rad.com/prepelectro

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

1702926 **Model 491 Prep Cell**, 100/120 V, includes buffer recirculation pump, prep cell starter kit with protein standard
 1702927 **Model 491 Prep Cell**, 220/240 V
 1702928 **Model 491 Prep Cell without Buffer Recirculation Pump**

Replacement Parts and Accessories for the Model 491 Prep Cell

1702944 **Prep Cell Casting Stand**
 1702929 **Buffer Recirculation Pump**, 100/120 V
 1702930 **Buffer Recirculation Pump**, 220/240 V
 1702932 **Small Gel Tube Assembly**, 28 mm ID
 1702933 **Large Gel Tube Assembly**, 37 mm ID
 1702934 **Cooling Finger Assembly**, includes feedline connectors
 1702935 **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
 1702936 **O-Ring Kits**, 2
 1702937 **Dialysis Membranes**, precut, 5
 1702938 **Frit Kit**, includes support frit and elution frit
 1702939 **Sample Application/Overlay Buffer Kit**, includes sample loading guide, syringe with tubing
 1702940 **Thumbscrews**, 4
 1702969 **Lid with Power Cables**
 1615101 **Prep Cell Starter Kit**
 1610323 **Prep Cell Starter Kit Protein Standard**, 1 ml
 1702941 **Elution Manifold Base**

Mini Prep Cells

1702915 **Mini Prep Cell with Reagent Starter Kit**
 1702908 **Mini Prep Cell without Reagent Starter Kit**

Replacement Parts and Accessories for the Mini Prep Cell

1702909 **Gel Tubes**, 2
 1702913 **Sample Application/Purge Kit**
 1702947 **Peristaltic Pump Adaptor Kit**, for 0.8 mm tubing
 1702948 **Elution Frit Kit**, with 5 dialysis membranes, MW cutoff 3,500
 1702911 **Elution Frit Kit**, with 5 dialysis membranes, MW cutoff 6,000
 1702912 **Harvest Ring Assembly**, includes elution collection tubing
 1702917 **Mini Prep Cell Elution Chamber Top**
 1702918 **Mini Prep Cell Casting Stand**
 1702916 **Elution Manifold Base**
 8007533 **Lid with Cables**, for mini prep cell

Preparative Electroelution Cells

Whole Gel Eluter and Mini Whole Gel Eluter Accessories

Ordering Information

Catalog #	Description
Whole Gel Eluter Accessories	
1651270	Whole Gel Eluter Template
1651275	Cellophane, 25 precut sheets
1651277	Sealing Tabs, 50
1651280	Lower Chamber Filter Paper, 21 x 21 cm, 75 precut sheets
1651281	Upper Chamber Filter Paper, 21 x 21 cm, 50 precut sheets
1702940	Thumbscrews, 4
Mini Whole Gel Eluter Accessories	
1651276	Cellophane, 25 precut sheets
1651278	Sealing Tabs, 50
1651282	Lower Chamber Filter Paper, 9 x 10 cm, 50 precut sheets
1651283	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 μ l. 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 μ l
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
1652976	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
1652977*	Model 422 Electro-Eluter Module, without buffer tank and lid
Accessories	
1652985	Membrane Caps, clear, MW cutoff 12,000–15,000, 12
1652986	Membrane Caps, green, MW cutoff 3,500, 12
1652987	Frits, 12
1652978	Glass Tubes, 6
1652981	Silicone Adaptors, 6
1651988	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 #1652976.

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

See Also

Precast gels:
page 180, 189.

Acrylamide:
page 207.

Premixed buffers:
page 204.

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

Ordering Information

Catalog #	Description
1651789	HydroTech Gel Drying System , 100/120 V, includes #1651745 and #1651781
1651790	HydroTech Gel Drying System , 220/240 V, includes #1651746 and #1651782
1651745	Model 583 Gel Dryer* , 100/120 V, includes porous gel support, transparent sealing gasket, filter paper backing, cellophane membrane backing, sequencing gel filter paper
1651746	Model 583 Gel Dryer* , 220/240 V, includes all items in #1651745

HydroTech Vacuum Pumps

1651781	HydroTech Vacuum Pump* , 100/120 V, includes pump, quick disconnect fittings for 1/4 and 3/8" ID vacuum tubing, vacuum tubing, drain tubing
1651782	HydroTech Vacuum Pump* , 220/240 V, includes all items in #1651781

HydroTech Vacuum Pump Accessories

1651783	Quick Disconnect Fitting , fits 1/4" ID tubing
1651784	Quick Disconnect Fitting , fits 3/8" ID tubing
1651785	Vacuum Tubing , 2 m, includes quick disconnect fitting, hose clamps, 2-way stopcock
1651786	Drain Tubing , 2 m, includes quick disconnect fitting, hose clamp
9100509	2-Way Stopcock
1651787	3-Way Stopcock
1651788	HydroTech Vacuum Gauge
1651791	Anti-Foam Agent , 100 ml

Double-Up Gel Drying Rack and Systems

1651796	Double-Up Gel Dryer Rack
1651797	Double-Up Gel Dryer System , 100/120 V, includes 2 Model 583 gel dryers (#1651745), HydroTech vacuum pump (#1651781), double-up gel dryer rack (#1651796)
1651798	Double-Up Gel Dryer System , 220/240 V, includes 2 Model 583 gel dryers (#1651746), HydroTech vacuum pump (#1651782), double-up gel dryer rack (#1651796)

Model 583 Drying Supports

1650962	Filter Paper Backing , for stained gels, 35 x 45 cm, 25 sheets
1650963	Cellophane Membrane Backing , clear membrane for transmission densitometry or overhead projection, 35 x 45 cm, 50 sheets
1650959	Sequencing Gel Filter Paper , for fragile sequencing gels, 35 x 45 cm, 25 sheets
1651747	Model 583 Gel Dryer Porous Gel Support* , 35 x 45 cm
1651748	Model 583 Transparent Sealing Gasket* , 41 x 51 cm

Drying Supports for Discontinued Products

1650922	Cellophane Membrane Backing , 18 x 34 cm, for Model 224, 443, and 543 slab gel dryers, 50 sheets
1650921	Thick Blot Paper , 18 x 34 cm, for Model 224, 443, and 543 slab gel dryers, 25 sheets

Gel Drying Solution

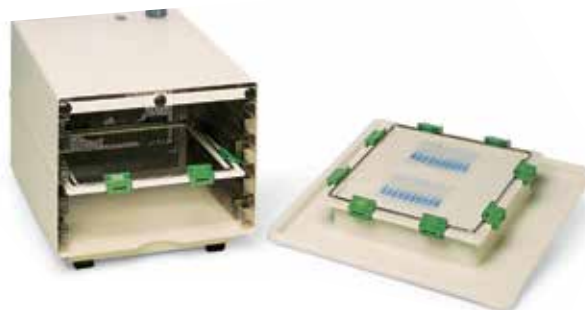
1610752	Gel Drying Solution , 1 L
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* Model 583 Gel Dryer and Hydrotech Vacuum Pump are not available for sale in European Union countries.

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
1651771	GelAir Drying System* , 115 V, 60 Hz, includes #1651777, 2 drying frames, 16 clamps, assembly table, 50 precut sheets of cellophane support, gel drying solution
1651772	GelAir Drying System* , 230 V, 50 Hz, includes #1651778, 2 drying frames, 16 clamps, assembly table, 50 precut sheets of cellophane support, gel drying solution
1651777	GelAir Dryer , 115 V, 60 Hz, gel drying oven only
1651778	GelAir Dryer , 230 V, 50 Hz, gel drying oven only

Accessories

1651775	GelAir Drying Frames , includes plastic drying frame, metal square frame, 16 clamps
1651776	GelAir Assembly Table
9207965	GelAir Plastic Drying Frame , for GelAir assembly table, does not include metal square frame
1651779	GelAir Cellophane Support , 50 precut sheets
1651780	GelAir Drying Frame Clamps , 8
1610752	Gel Drying Solution , 1 L

* GelAir Drying System is not available for sale in European Union countries.

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](http://www.bio-rad.com/tech/westernblotting)
Web: www.bio-rad.com/tech/westernblotting

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™ Touch imaging system — 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 minutes (pages 180, 190)
- 2. Visualize proteins** — protein separation is visualized and confirmed, using stain-free technology, after 1 minute activation on the ChemiDoc Touch imaging system. Stain-free technology is a sensitive, time-saving alternative to traditional Coomassie staining (page 291)
- 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 236)
- 4. Verify protein transfer** — ChemiDoc Touch imaging system paired with stain-free technology enables instant verification of protein transfer (page 291)
- 5. Validate and quantitate** — ChemiDoc Touch imaging system 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


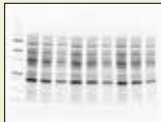

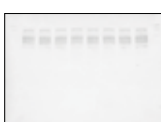

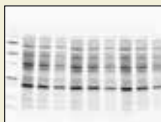

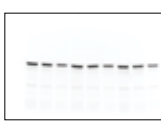






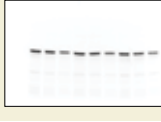
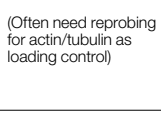
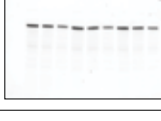
Validate Western Blot

Perform multiplex imaging and validate results by total protein normalization on the ChemiDoc MP imager

Ordering Information

Catalog #	Description
1708381	ChemiDoc Touch V3 Western Workflow for Mini Gels , includes ChemiDoc Touch imager with Image Lab software, UV/stain-free sample tray, 50 Mini-PROTEAN TGX Any kD Stain-Free precast gels, SDS-PAGE accessories, Mini-PROTEAN Tetra cell, Trans-Blot Turbo starter kit, 50 PVDF transfer packs for mini gels
1708382	ChemiDoc Touch V3 Western Workflow for Midi Gels , includes ChemiDoc Touch imager with Image Lab software, UV/stain-free sample tray, 50 4–20% Criterion TGX Stain-Free precast gels, SDS-PAGE accessories, Criterion cell, Trans-Blot Turbo starter kit, 50 PVDF transfer packs for midi gels

Bio-Rad V3 Western Workflow vs. Traditional Western Workflow

Bio-Rad V3 Western Workflow		Time	Data
Total time: 6 hr	1 Electrophoresis TGX Stain-Free™ gel Criterion™ cell ChemiDoc™ MP system 	20–30 min	 Pre-transfer gel stain-free image to check sample integrity and separation quality
	2 Transfer Trans-Blot® Turbo™ system ChemiDoc MP system 	3–10 min	 Post-transfer gel stain-free image to measure transfer efficiency
	3 Antibody Incubation Clarity™ western ECL substrate 	~5 hr	 Stain-free blot image as loading control
	4 Imaging and Analysis ChemiDoc MP system (no need to strip and reprobe) 	10–15 min	 Target proteins (chemiluminescence) or  Target proteins (fluorescence)
Traditional Western Workflow		Time	Data
Total time: 16 hr	1 Gel Preparation 	>1 hr gel prep	—
	2 Electrophoresis 	~1 hr gel run	—
	3 Transfer 	1–3 hr	—
	4 Antibody Incubation 	~5 hr	—
	5 Imaging and Analysis 	>30 min	 Target proteins
	6 Strip and Reprobe (Often need reprobing for actin/tubulin as loading control) 	~5 hr	 Loading control

For More Information
 Web: www.bio-rad.com/V3

Transfer Devices

Overview of Blot Transfer Systems

- **Rapid transfer systems** — Trans-Blot Turbo system (page 236) for rapid transfer of proteins, suitable for high molecular weight and low molecular weight proteins
- **Semi-dry transfer systems** — Trans-Blot SD for rapid, high-intensity transfers, best suited for mid-range proteins, 10–100 kD or >200 kD (page 236)
- **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 (page 238)
- **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 (page 242)

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					~30 min	3–10 min
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	—		
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. The Trans-Blot Turbo integrates speed, reproducible 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

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 either use 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

1704150	Trans-Blot Turbo Transfer System , includes 2 cassettes, roller
1704151	Trans-Blot Turbo Cassette , 1 cassette
1704152	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	1704156	1704157
Trans-Blot Turbo Transfer Pack, Nitrocellulose , pkg of 10	1704158	1704159
Trans-Blot Turbo RTA Transfer Kit, Nitrocellulose , for 40 blots	1704270	1704271
Trans-Blot Turbo RTA Transfer Kit, PVDF , for 40 blots	1704272	1704273
Trans-Blot Turbo RTA Transfer Kit, LF PVDF , for 40 blots	1704274	1704275

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:

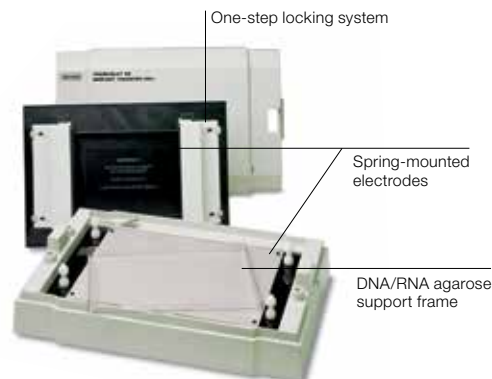
- Transfers in as little as 15–60 min
- Minimal buffer requirements
- Capacity to transfer multiple gel sizes
- Single-step locking system for simple setup
- Platinum-coated titanium anode and stainless-steel cathode plate electrodes that provide consistent and reliable transfers, durability, and years 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

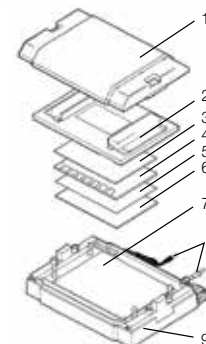
Web: www.bio-rad.com/transblotsd

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.



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
1703940*	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)
1703848	Trans-Blot SD Cell and PowerPac HC Power Supply , 100–120/220–240 V, includes #1703940 and #16-5052
1703849	Trans-Blot SD Cell and PowerPac Universal Power Supply , 100–120/220–240 V, includes #1703940 and #1645070

Accessories

1703947	Cathode Plate , stainless-steel upper electrode
1703942	Anode Plate , platinum-coated lower electrode
1704019	Trans-Blot SD Agarose Gel Support Frame , includes extra thick blot paper (15 x 20 cm, 30 sheets)
1703957	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.

See Also

PowerPac HC power supply: page 167.

Blotting buffers: page 248.

Wet/Tank Blotting Systems

See Also

PowerPac Basic and HC power supplies: page 167.

Ready Gel precast gels: page 183.

Blotting membranes: page 244.

Blot detection reagents: page 248.

Buffers: page 248.

Mini Trans-Blot® Cell

This cell provides 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 as either a complete stand-alone apparatus or 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
1703930	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
1703935*	Mini Trans-Blot Module , without lower buffer tank and lid
1703989	Mini Trans-Blot Cell and PowerPac Basic Power Supply , includes #1703930 and #1645050
1703836	Mini Trans-Blot Cell and PowerPac HC Power Supply , includes #1703930 and #1645052
1658029	Mini-PROTEAN Tetra Cell and Mini Trans-Blot Module , includes 10-well, 1.0 mm, 4-gel system (#1658001) and blotting module (#1703935) without lower buffer tank and lid, gel casting accessories
1658033	Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes #1658001, #1703935, and #1645050
1658034	Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes #1658004, #1703935, and #1645050
1658036	Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes #1658004, #1703935, and #1645052
1658035	Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes #1658001, #1703935, and #1645052

Accessories

1703931	Mini Gel Holder Cassette
1703932	Thick Blot Paper , 7.5 x 10 cm, for Mini Trans-Blot cassette, 50 sheets
1703933	Foam Pads , 8 x 11 cm, 4
1703812	Mini Trans-Blot Central Core
1703919	Blue Cooling Unit , for Mini-PROTEAN Tetra tanks
1703934	Bio-Ice Cooling Unit , for Mini-PROTEAN 3 tanks
1651279	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

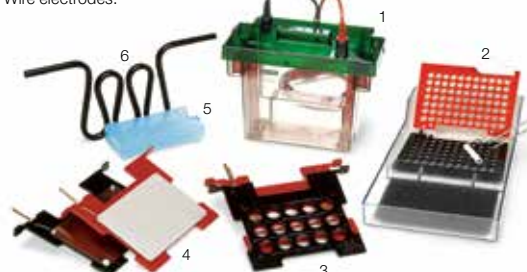
Specifications

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.

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.



See Also

PowerPac Basic and PowerPac HC power supplies: page 167.

Criterion precast gels: page 189.

Blotting membranes: page 244.

Blot detection reagents: page 248.

Buffers: page 248.

Ordering Information

Catalog #	Description
1704070	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
1704071	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
1656024	Criterion Cell/Plate Blotter System , includes #1656001 and #1704070
1656025	Criterion Cell/Wire Blotter System , includes #1656001 and #1704071
1703872	Criterion Blotter with Plate Electrodes and PowerPac HC Power Supply , includes #1704070 and #1645052
1703874	Criterion Blotter with Wire Electrodes and PowerPac HC Power Supply , includes #1704071 and #1645052

Accessories

1704076	Optional Criterion Blotter Cooling Coil
1704077	Criterion Blotter Buffer Tank
1704079	Criterion Blotter Lid
1704080	Criterion Blotter Gel Holder Cassette
1704081	Criterion Blotter Platinum Anode Plate Electrode
1704082	Criterion Blotter Stainless-Steel Cathode Plate Electrode
1704083	Criterion Blotter Wire Electrode Card , anode
1704084	Criterion Blotter Wire Electrode Card , cathode
1704085	Thick Blot Paper , 9.5 x 15.2 cm, for Criterion blotter, 50 sheets
1704086	Foam Pads , 9.5 x 15.2 cm, 4
1704087	Sealed Ice Blocks , for Criterion blotter, 2
1704089	Criterion Gel/Blot Assembly Tray
1651279	Roller , 3.5" wide

See Also

PowerPac HC power supply: page 167.

Precast gels: page 180, 189.

Blotting membranes: page 244.

Blot detection reagents: page 248.

Buffers: page 248.

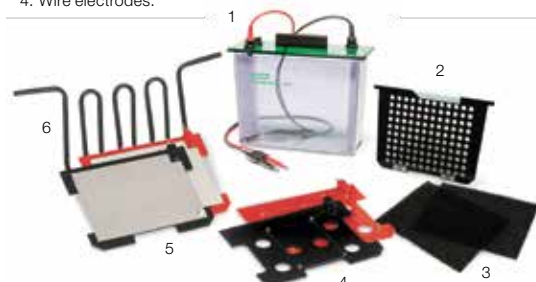
Trans-Blot® Cell

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
1703939*	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)
1703853*	Trans-Blot Cell with Plate Electrodes, Super Cooling Coil, and PowerPac HC Power Supply , includes #1703939, #1703912, and #1645052
1703946	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)
1703850	Trans-Blot Cell with Plate Electrodes and PowerPac HC Power Supply , includes #1703946 and #1645052
1703910	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)
1703825	Trans-Blot Cell with Wire Electrodes and PowerPac HC Power Supply , includes #1703910 and #1645052

Accessories

1703914	Foam Pads , 15.5 x 20.5 cm, 6
1703956	Thick Blot Paper , 15 x 20 cm, for Trans-Blot cassette, 25 sheets
1703960	Extra Thick Blot Paper , 15 x 20 cm, 30 sheets
1703943	Trans-Blot Platinum Anode Plate Electrode
1703944	Trans-Blot Stainless-Steel Cathode Plate Electrode
1703945	Trans-Blot Plate Electrode Pair , platinum anode and stainless-steel cathode
1703920	Trans-Blot Standard Wire Electrode Card , cathode
1703921	Trans-Blot Standard Wire Electrode Card , anode
1703912	Super Cooling Coil , required for all high-intensity transfers
1703913	Gel Holder Cassette , includes 2 foam pads
1703922	Trans-Blot Cell Buffer Tank
1703923	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 167.
Precast gels: page 180, 189.
Blotting membranes: page 244.
Blot detection reagents: page 248.
Gel clip: page 202.
Buffers: page 248.

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
1703990*	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
1703991	Trans-Blot Plus Cell and PowerPac HC Power Supply , 100–120/220–240 V, includes #1703990 and #1645052
1703992	Trans-Blot Plus Cell and PowerPac Universal Power Supply , 100–120/220–240 V, includes #1703990 and #1645070
1654144	PROTEAN Plus Dodeca Cell (100/120 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply , includes #1654150, #1703990, and #1645070
1654145	PROTEAN Plus Dodeca Cell (220/240 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply , includes #1654151, #1703990, and #1645070

Accessories

1703995	Foam Pads , 27 x 28.5 cm, 2
1703997	Stirbar
1703998	Trans-Blot Plus Roller , 6 in wide
1704990	Trans-Blot Plus Super Cooling Coil
1704991	Trans-Blot Plus Platinum Anode Plate Electrode
1704992	Trans-Blot Plus Stainless-Steel Cathode Plate Electrode

* 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

Dot format matches
96-well microplates

Modular design provides one base
plate for either Bio-Dot or Bio-Dot
SF template

Slot format allows easy
densitometric analyses to
determine relative
amounts of protein

Three-way vacuum valve allows sample
loading by gravity and quick washes

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
1703938	Bio-Dot Microfiltration System , includes Bio-Dot apparatus (#1706545) and Bio-Dot SF module (#1706543) templates, vacuum manifold base, gasket support plates, gasket
1706545	Bio-Dot Apparatus , includes Bio-Dot sample template, vacuum manifold base, gasket support plate, gasket
1706547	Bio-Dot Module , without vacuum manifold base, for conversion of Bio-Dot SF to Bio-Dot apparatus
1706542	Bio-Dot SF Apparatus , includes Bio-Dot SF sample template, vacuum manifold base, gasket support plate, gasket, filter paper
1706543	Bio-Dot SF Module , without vacuum manifold base, for conversion of Bio-Dot to Bio-Dot SF apparatus

Accessories

1706546	Bio-Dot Gaskets , 3
1706544	Bio-Dot SF Gaskets , 2
1620161	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
1704017	Mini-PROTEAN II Multiscreen Apparatus , includes 2 sample templates, 2 gaskets, base plate
1704018	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
1703902	Mini Incubation Trays , 20
1703903	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

Blotting Membrane and Filter Paper Selection Guide

Membrane	Pore Size	Binding Capacity (µg/cm ²)	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
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® Turbo™	7 x 8.5 cm 8.5 x 13.5 cm	7.5 x 10.5 cm 9.5 x 15.2 cm	7 x 8.5 cm 8.5 x 13.5 cm (see page 245)
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 247.

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)			
1620112	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)	
1620212	Nitrocellulose/Filter Paper Sandwiches , 0.2 µm, 7 x 8.4 cm, 20 pack		
1620213	Nitrocellulose/Filter Paper Sandwiches , 0.2 µm, 7 x 8.4 cm, 50 pack		
1620232	Nitrocellulose/Filter Paper Sandwiches , 0.2 µm, 8.5 x 13.5 cm, 20 pack		
1620233	Nitrocellulose/Filter Paper Sandwiches , 0.2 µm, 8.5 x 13.5 cm, 50 pack		
1620146	Nitrocellulose Membranes , 0.2 µm, 7 x 8.4 cm, 10 sheets		
1620168	Nitrocellulose Membranes , 0.2 µm, 8.5 x 13.5 cm, 10 sheets		
1620147	Nitrocellulose Membranes , 0.2 µm, 13.5 x 16.5 cm, 10 sheets		
1620150	Nitrocellulose Membranes , 0.2 µm, 20 x 20 cm, 5 sheets	Transfer of low MW (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)	
1620252	Nitrocellulose Membranes , 0.2 µm, 26.5 x 28 cm, 10 sheets		
Nitrocellulose Membranes (0.45 µm)			
1620115	Nitrocellulose Membrane , 0.45 µm, 30 cm x 3.5 m, 1 roll		Transfer of low MW (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)
1620214	Nitrocellulose/Filter Paper Sandwiches , 0.45 µm, 7 x 8.4 cm, 20 pack		
1620215	Nitrocellulose/Filter Paper Sandwiches , 0.45 µm, 7 x 8.4 cm, 50 pack		
1620234	Nitrocellulose/Filter Paper Sandwiches , 0.45 µm, 8.5 x 13.5 cm, 20 pack		
1620235	Nitrocellulose/Filter Paper Sandwiches , 0.45 µm, 8.5 x 13.5 cm, 50 pack		
1620145	Nitrocellulose Membranes , 0.45 µm, 7 x 8.4 cm, 10 sheets		
1620167	Nitrocellulose Membranes , 0.45 µm, 8.5 x 13.5 cm, 10 sheets		
1620117	Nitrocellulose Membranes , 0.45 µm, 9 x 12 cm, 10 sheets		
1620148	Nitrocellulose Membranes , 0.45 µm, 11.5 x 16 cm, 10 sheets		
1620114	Nitrocellulose Membranes , 0.45 µm, 15 x 9.2 cm, 10 sheets		
1620116	Nitrocellulose Membranes , 0.45 µm, 15 x 15 cm, 10 sheets	Protein and nucleic acid blotting	
1620113	Nitrocellulose Membranes , 0.45 µm, 20 x 20 cm, 5 sheets		
1620251	Nitrocellulose Membranes , 0.45 µm, 26.5 x 28 cm, 10 sheets		
Supported Nitrocellulose Membranes (0.2 µm)			
1620097	Supported Nitrocellulose Membrane , 0.2 µm, 30 cm x 3 m, 1 roll	Protein and nucleic acid blotting	
1620095	Supported Nitrocellulose Membranes , 0.2 µm, 7 x 8.4 cm, 10 sheets		
1620071	Supported Nitrocellulose Membranes , 0.2 µm, 8.5 x 13.5 cm, 10 sheets		
Supported Nitrocellulose Membranes (0.45 µm)			
1620094	Supported Nitrocellulose Membrane , 0.45 µm, 30 cm x 3 m, 1 roll	Protein and nucleic acid blotting	
1620090	Supported Nitrocellulose Membranes , 0.45 µm, 7 x 8.4 cm, 10 sheets		
1620070	Supported Nitrocellulose Membranes , 0.45 µm, 8.5 x 13.5 cm, 10 sheets		
1620093	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/cm².

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/cm².

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. This membrane is highly recommended for the V3 Western Workflow™.

For More Information

Web: www.bio-rad.com/v3

Request or download bulletins: 2212 and 6116

Western Blotting

Membranes and Filter Papers

www.bio-rad.com/blottingmembranes

Ordering Information

Catalog # Description

Immun-Blot PVDF Membranes

1620177	Immun-Blot PVDF Membrane, 26 cm x 3.3 m, 1 roll
1620218	Immun-Blot PVDF/Filter Paper Sandwiches, 7 x 8.4 cm, 20 pack
1620219	Immun-Blot PVDF/Filter Paper Sandwiches, 7 x 8.4 cm, 50 pack
1620238	Immun-Blot PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 20 pack
1620239	Immun-Blot PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 50 pack
1620174	Immun-Blot PVDF Membranes, 7 x 8.4 cm, 10 sheets
1620175	Immun-Blot PVDF Membranes, 10 x 15 cm, 10 sheets
1620176	Immun-Blot PVDF Membranes, 20 x 20 cm, 10 sheets
1620255	Immun-Blot PVDF Membranes, 25 x 28 cm, 10 sheets

Sequi-Blot PVDF Membranes

1620184	Sequi-Blot PVDF Membrane, 26 cm x 3.3 m, 1 roll
1620237	Sequi-Blot PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 50 pack
1620186	Sequi-Blot PVDF Membranes, 7 x 8.4 cm, 10 sheets
1620180	Sequi-Blot PVDF Membranes, 10 x 15 cm, 10 sheets
1620181	Sequi-Blot PVDF Membranes, 15 x 15 cm, 10 sheets
1620182	Sequi-Blot PVDF Membranes, 20 x 20 cm, 10 sheets

Immun-Blot Low-Fluorescence PVDF Membranes

1620260	Low Fluorescence PVDF/Filter Paper Sandwiches, 7 x 8.5 cm, 10 pack
1620261	Low Fluorescence PVDF/Filter Paper Sandwiches, 7 x 8.5 cm, 20 pack
1620262	Low Fluorescence PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 10 pack
1620263	Low Fluorescence PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 20 pack
1620264	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 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 μ g 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	1620159	1620196
20 cm x 3.3 m, 1 roll	1620165	1620197
7 x 10 cm, 15 sheets	1620206	1620208
9 x 12 cm, 15 sheets	1620153	1620190

continues

Ordering Information

Description	Zeta-Probe	Zeta-Probe GT
Zeta-Probe and Zeta-Probe GT Membranes (cont.)		
10 x 15 cm, 15 sheets	1620154	1620191
15 x 15 cm, 15 sheets	1620155	1620192
15 x 20 cm, 15 sheets	1620156	1620193
20 x 20 cm, 15 sheets	1620157	1620194
20 x 25 cm, 3 sheets	1620158	1620195
Catalog #	Description	
C/P Lift Membranes		
1620162	C/P Lift Membrane Disks, 85 mm, 50	
1703202	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)		
1703965	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)
1703966	Extra Thick Blot Paper , 7 x 8.4 cm, for Ready Gel or Mini-PROTEAN Tetra gels, 60 sheets	
1703967	Extra Thick Blot Paper , 8 x 13.5 cm, for Criterion precast gels, 60 sheets	
1703968	Extra Thick Blot Paper , 14 x 16 cm, for PROTEAN II xi gels, 30 sheets	
1703969	Extra Thick Blot Paper , 19 x 18.5 cm, for PROTEAN II XL gels, 30 sheets	
1703958	Extra Thick Blot Paper , 10 x 15 cm, 30 sheets	
1703959	Extra Thick Blot Paper , 15 x 15 cm, 30 sheets	
1703960	Extra Thick Blot Paper , 15 x 20 cm, 30 sheets	
Blot Absorbent Filter Paper (Thick)		
1703932	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
1704085	Thick Blot Paper , 9.5 x 15.2 cm, for Criterion blotter, 50 sheets	
1703955	Thick Blot Paper , 14 x 16 cm, for PROTEAN II xi gels, 25 sheets	
1703956	Thick Blot Paper , 15 x 20 cm, for Trans-Blot cassette, 25 sheet	
1650921	Thick Blot Paper , 18 x 34 cm, for Model 224, 443, and 543 slab gel dryers, 25 sheets	
1620161	Bio-Dot/Bio-Dot SF Filter Paper , 7.7 x 11.3 cm, 60 sheets	
1650962	Filter Paper Backing , 35 x 45 cm, for stained gels, 25 sheets	
Blot Absorbent Filter Paper (Thin)		
1620118	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 255. Tracking dyes can be found on page 271.

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 Buffers	
1610734	10x Tris/Glycine, 1 L	1706537	Gelatin, EIA grade, 200 g
1610771	10x Tris/Glycine, 5 L cube	1706404	Blotting-Grade Blocker, nonfat dry milk, 300 g
1610778	10x Tris/CAPS, 1L		
1610780	10x Phosphate Buffered Saline, 1 L	1706531	Tween 20, EIA grade, 100 ml
1706435	10x Tris Buffered Saline, 1 L	1610781	10% (w/v) Tween 20, for easy pipetting, 1 L
		1610418	SDS Solution, 20% (w/v), 1 L
		1610783	1x Phosphate Buffered Saline with 1% Casein*, 1 L
		1610782	1x Tris Buffered Saline with 1% Casein*, 1 L
Reagents			
1610610	Dithiothreitol (DTT)*, 1 g	1610710	2-Mercaptoethanol, 25 ml
1610611	Dithiothreitol (DTT)*, 5 g	1632101	Tributylphosphine (TBP), 200 mM, 0.6 ml
1610729	EDTA, 500 g		
1706537	Gelatin, EIA grade, 200 g	1610713	Tricine, 500 g
1610717	Glycine, 250 g	1610716	Tris, 500 g
1610718	Glycine, 1 kg	1610719	Tris, 1 kg
		1610730	Urea, 250 g

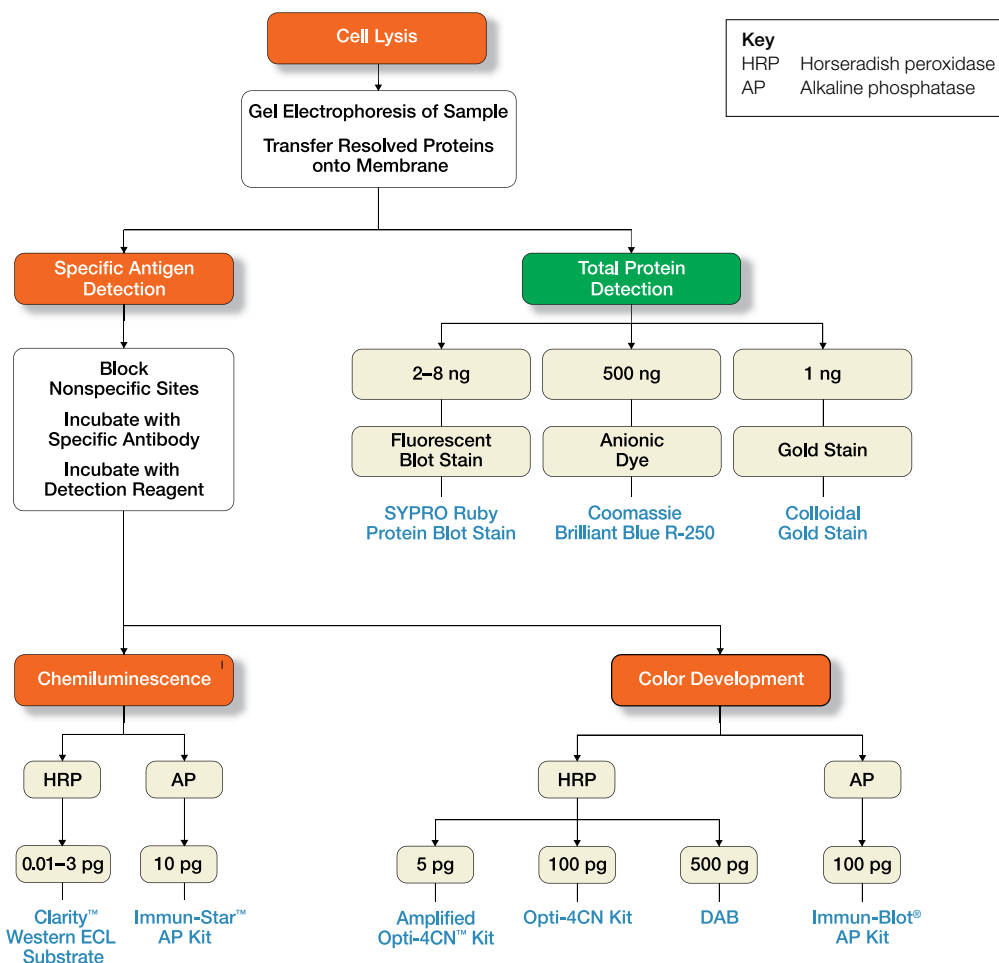
* Store at 2–8°C.

** 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 page 290).

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 antibody 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, PVDF, or LF PVDF

Clarity™ Western ECL Substrate

Clarity 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
1705060	Clarity Western ECL Substrate , 200 ml size contains Clarity western peroxide reagent, 100 ml, and Clarity western luminol/enhancer reagent, 100 ml
1705061	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				
1705010	GAM-AP Detection Kit***	•	•	•
1705011	GAR-AP Detection Kit***	•	•	•
1705018	AP Substrate, 125 ml	•		
1705012	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 cm² 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 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*	
1708235	Opti-4CN Substrate Kit
Amplified Opti-4CN Kits*	
1708238	Amplified Opti-4CN Substrate Kit
1708240	Amplified Opti-4CN Goat Anti-Mouse Detection Kit
1708239	Amplified Opti-4CN Goat Anti-Rabbit Detection Kit
Immun-Blot HRP Assay Kits, With 4CN**	
1706463	Goat Anti-Rabbit IgG (H + L)-HRP Assay Kit
1706464	Goat Anti-Mouse IgG (H + L)-HRP Assay Kit
1706465	Goat Anti-Human IgG (H + L)-HRP Assay Kit
Premixed Substrate Reagents	
1706431	HRP Conjugate Substrate Kit, contains premixed 4CN, hydrogen peroxide solutions, color development buffer; makes 1 L color development solution
Individual Blotting Substrates	
1706534	HRP Color Development Reagent, 4CN, 5 g
1706535	HRP Color Development Reagent, DAB, 5 g

Opti-4CN Kits*

Amplified Opti-4CN Kits*

Immun-Blot HRP Assay Kits, With 4CN**

Premixed Substrate Reagents

Individual Blotting Substrates

* Each kit contains enough reagent for 2,500 cm² 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 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
Opti-4CN Kits*	
1706460	Goat Anti-Rabbit IgG (H + L)-AP Assay Kit
1706461	Goat Anti-Mouse IgG (H + L)-AP Assay Kit
1706462	Goat Anti-Human IgG (H + L)-AP Assay Kit
Immun-Blot HRP Assay Kits, With 4CN**	
1706404	Blotting-Grade Blocker, nonfat dry milk, 300 g
Premixed Substrate Reagents	
1706432	AP Conjugate Substrate Kit, contains premixed BCIP and NBT solutions and color development buffer; makes 1 L color development solution

Opti-4CN Kits*

Immun-Blot HRP Assay Kits, With 4CN**

Premixed Substrate Reagents

* 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 binding. — 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			
1706515	Goat Anti-Rabbit IgG (H + L)-HRP, 2 ml	1706522	Protein A-HRP, 1 ml
1706516	Goat Anti-Mouse IgG (H + L)-HRP, 2 ml	1706425	Protein G-HRP, 1 ml
1721050	Goat Anti-Human IgG (H + L)-HRP, 2 ml	1706528	Avidin-HRP, 2 ml
Blotting-Grade Conjugates, AP			
1706518	Goat Anti-Rabbit IgG-AP, 1 ml	1706521	Goat Anti-Human IgG-AP, 1 ml
1706520	Goat Anti-Mouse IgG-AP, 1 ml		
Detergents and Blocking Reagents			
1706537	Gelatin, EIA grade, 200 g	1610418	SDS Solution, 20% (w/v), 1 L
1706404	Blotting-Grade Blocker, nonfat dry milk, 300 g	1610783	1x Phosphate Buffered Saline with 1% Casein*, 1 L
1706531	Tween 20, EIA grade, 100 ml	1610782	1x Tris Buffered Saline with 1% Casein*, 1 L
1610781	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 page 211.

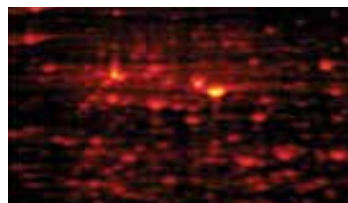
Total Protein Stains

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

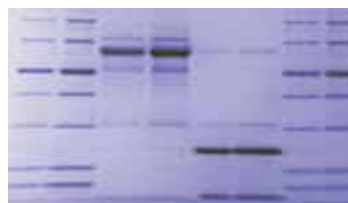
SYPRO Ruby protein blot stain provides highly sensitive detection of proteins on PVDF or nitrocellulose membranes. After staining, target proteins can be detected by colorimetric or chemiluminescence immunostaining or analyzed by microsequencing or mass spectrometry with no interference from the stain.



SYPRO Ruby protein gel stain.

Coomassie Brilliant Blue R-250 Dye

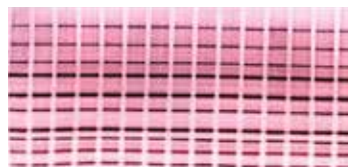
Coomassie Brilliant Blue R-250 is an anionic dye used for staining gels and membranes (PVDF and nitrocellulose). It is a rapid and inexpensive stain that can detect nanogram levels of protein. Since this dye can interfere with antibody binding sites, subsequent detection of proteins by immunostaining 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
1703127	SYPRO Ruby Protein Blot Stain, 200 ml
1610400	Coomassie Brilliant Blue R-250, 10 g
1706527	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 273.

PowerPac Basic
power supply:
page 167.

DNA ladders:
page 274.

Premixed
electrophoresis
buffers: page 272.

Nucleic acid reagents:
page 271.

Gel documentation
systems:
page 290.

ReadyAgarose
precast gels:
page 264.

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

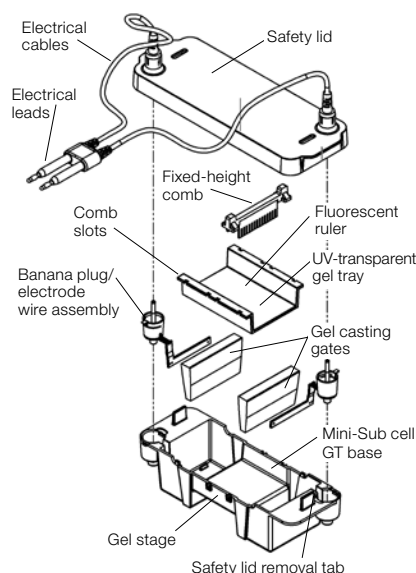
Key features of the Sub-Cell family of cells include:

- 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	15 x 7 cm	15 x 10 cm	25 x 10 cm	25 x 10 cm
	7 x 10 cm	15 x 10 cm	15 x 15 cm	25 x 15 cm	25 x 15 cm
			15 x 20 cm		25 x 20 cm
			15 x 25 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.

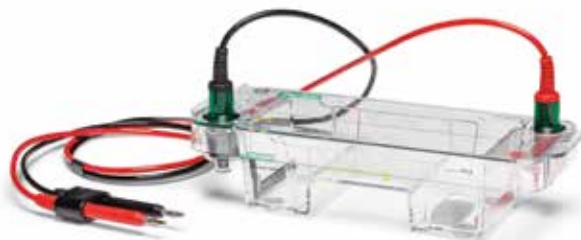
Mini-Sub® Cell GT Cells

The redesigned Mini-Sub cell GT cell offers updated features that make electrophoresis even easier. A 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 (#1704487 and #1640303) 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



Nucleic Acid Electrophoresis and Blotting

DNA Electrophoresis Systems

www.bio-rad.com/DNAelectro

Ordering Information

Catalog #	Casting Gates	Gel Caster	UVTP Tray, cm		Combs		PowerPac™ Basic Power Supply (#16-5050)
			7 x 7*	7 x 10	8-Well	15-Well	
Mini-Sub Cell GT Systems**							
1704406	•		•		•	•	
1704466				•	•	•	
1704486	•	•	•		•	•	
1704467		•		•	•	•	
1640300		•		•	•	•	•
1704487							
1640303							•

Catalog # Description

Mini-Sub Cell GT Accessories

1704491	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
1704422	Mini-Gel Caster , for Mini-Sub and wide Mini-Sub cell GT systems
1704436*	Sub-Cell GT UV-Transparent Mini-Gel Tray , 7 x 7 cm (trays have 2 slots for fixed-height combs)
1704435	Sub-Cell GT UV-Transparent Mini-Gel Tray , 7 x 10 cm (trays have 2 slots for fixed-height combs)
1704330**	Original UV-Transparent Mini-Gel Tray , 7 x 10 cm
1704434	Mini-Sub Cell GT Casting Gates , 2
1704362	Mini-Sub Cell GT Anode (Red) Quick Snap Electrode Assembly
1704363	Mini-Sub Cell GT Cathode (Black) Quick Snap Electrode Assembly
1704331	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						
1704464	15	Fixed	0.75	2.6	10.2	9.7
1704465***	15	Fixed	1.5	2.6	10.2	19.4
1704332	15	Adjustable	1.0	2.6	10.2	13.0
1704462	8	Fixed	0.75	5.5	11.0	20.8
1704463***	8	Fixed	1.5	5.5	11.0	41.6
1704333	8	Adjustable	1.0	5.5	10.2	27.7
1704461	2 preparative	Fixed	1.5	20.0	10.2	152.4
	2 reference			4.0		30.0
1704460	1 preparative	Fixed	1.5	43.4	10.2	325.7
	2 reference			3.0		22.5
1704342	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 cm gels can be cast with a gel caster.

** Mini-Sub cell systems purchased before 1996 (Mini-Sub DNA cell) require casting tray #1704330. This tray is not compatible with the Mini-Sub cell GT system.

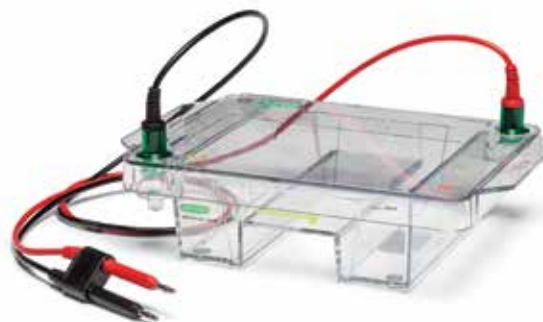
*** Combs included in systems.

† Fixed-height combs must be used with Mini-Sub cell GT system gel trays. Adjustable-height combs require comb holder, #1704331.

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 (#1704489 and #1640304) 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		Combs		PowerPac™ Basic Power Supply (#1645050)
			15 x 7*	15 x 10	15-Well	20-Well	
Wide Mini-Sub Cell GT Systems**							
1704405	•		•		•	•	
1704468				•	•	•	
1704485	•	•	•		•	•	
1704469		•		•	•	•	
1640301		•		•	•	•	•
1704489							
1640304							•

Catalog # Description

Wide Mini-Sub Cell GT Accessories

1704497	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
1704422	Mini-Gel Caster , for Mini-Sub and wide Mini-Sub cell GT systems
1704426	Sub-Cell GT UV-Transparent Wide Mini-Gel Tray , 15 x 7 cm (trays have 2 slots for fixed-height combs)
1704416**, ***	Sub-Cell GT UV-Transparent Gel Tray , 15 x 10 cm (trays have 2 slots for fixed-height combs)
1704425	Wide Mini-Sub Cell GT Casting Gates , 2
1704372	Wide Mini-Sub Cell GT Anode (Red) Quick Snap Electrode Assembly
1704373	Wide Mini-Sub Cell GT Cathode (Black) Quick Snap Electrode Assembly
1704320	Comb Holder , for Sub-Cell and wide Mini-Sub cell adjustable-height combs
1704331	Mini-Comb Holder , for 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.

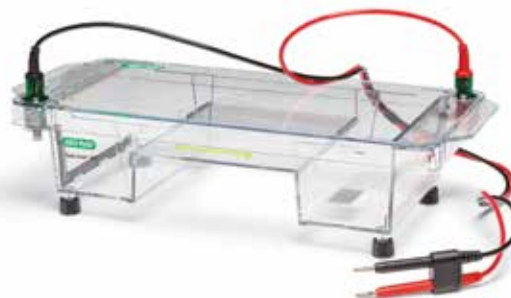
Nucleic Acid Electrophoresis and Blotting

DNA Electrophoresis Systems

www.bio-rad.com/DNAelectro

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

Ordering Information			UVTP Tray, cm				Combs		PowerPac™ Basic Power Supply (#1645050)
Catalog #	Casting Gates	Gel Caster	15 x 10	15 x 15*	15 x 20	15 x 25	15-Well	20-Well	
Sub Cell GT Systems**									
1704401			•				•	•	
1704402	•			•			•	•	
1704403					•		•	•	
1704404						•	•	•	
1704481		•	•				•	•	
1704482	•	•		•			•	•	
1704483		•			•		•	•	
1704484		•				•	•	•	
1640302	•	•		•			•	•	•

Catalog # Description

Sub-Cell GT Accessories

1704412	Gel Caster , full size
1704416**	Sub-Cell GT UV-Transparent Gel Tray , 15 x 10 cm (trays have 2 slots for fixed-height combs)
1704417*	Sub-Cell GT UV-Transparent Gel Tray , 15 x 15 cm
1704418	Sub-Cell GT UV-Transparent Gel Tray , 15 x 20 cm
1704419	Sub-Cell GT UV-Transparent Gel Tray , 15 x 25 cm
1704415	Sub-Cell GT Casting Gates , 2
1704392	Sub-Cell GT Anode (Red) Quick Snap Electrode Assembly
1704393	Sub-Cell GT Cathode (Black) Quick Snap Electrode Assembly
1704320	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*						
1704449	30	Fixed	1.5	2.7	14.0	20.2
1704344	30	Adjustable	1.5	2.7	19.1	20.2
1704447	20	Fixed	0.75	4.8	14.0	18.2
1704448**	20	Fixed	1.5	4.8	14.0	36.3
1704321	20	Adjustable	0.75	4.8	19.1	18.2
1704322	20	Adjustable	1.5	4.8	19.1	36.4
1704445	15	Fixed	0.75	5.5	14.0	20.7
1704446**	15	Fixed	1.5	5.5	14.0	41.4
1704323	15	Adjustable	0.75	5.5	19.1	20.7
1704324	15	Adjustable	1.5	5.5	19.1	41.4
1704443	10	Fixed	0.75	9.9	14.0	37.0
1704444	10	Fixed	1.5	9.9	14.0	74.0
1704325	10	Adjustable	0.75	9.9	19.1	37.0
1704326	10	Adjustable	1.5	9.9	19.1	74.0
Preparative Combs for Sub-Cell GT Systems*						
1704442	4 preparative 2 reference	Fixed	1.5	26.4	14.0	200.0
1704441	2 preparative 2 reference	Adjustable	1.5	50.3	14.0	377.0
1704440	1 preparative 2 reference	Fixed	1.5	106.4	14.0	800.0
1704328	1 preparative 2 reference	Adjustable	3.0	106.4	14.0	1,596.0
Multichannel Pipet-Compatible Combs for Wide Mini Sub-Cell and Sub-Cell GT Systems*						
1704456	26	Fixed	0.75	2.9	14.0	10.9
1704457	26	Fixed	1.5	2.9	14.0	21.8
1704454	18	Fixed	0.75	2.9	14.0	11.2
1704455	18	Fixed	1.5	2.9	14.0	22.5
1704452	14	Fixed	0.75	5.8	14.0	22.5
1704453	14	Fixed	1.5	5.8	14.0	45.0
1704450	10	Fixed	0.75	5.8	14.0	22.5
1704451	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, #1704320.

** Combs included in systems.

Nucleic Acid Electrophoresis and Blotting

DNA Electrophoresis Systems

www.bio-rad.com/DNAelectro

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		Combs		PowerPac™ Basic Power Supply (#1645050)
			25 x 10*	25 x 15	26-Well	51-Well	
Sub-Cell Model 96 Systems							
1704502	•		•		•	•	
1704503				•	•	•	
1704500	•	•	•		•	•	
1704501		•		•	•	•	
1640305	•	•	•		•	•	•

Catalog # Description

Sub-Cell Model 96 Accessories

1704514	Model 96 Gel Caster
1704521*	Model 96/192 UV-Transparent Gel Tray, 25 x 10 cm
1704522	Model 96/192 UV-Transparent Gel Tray, 25 x 15 cm
1704520	Model 96/192 Gel Casting Gates, 2
1704518	Model 96/192 Anode (Red) Electrode Assembly
1704519	Model 96/192 Cathode (Black) Electrode Assembly
1704537	Model 96/192 Buffer Recirculation Kit, includes 2 recirculation port fittings, 6' Tygon tubing, 4 tubing clips
1704525	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**						
1704528***	51	—	0.75	3.0	15.0	11.2
1704529***, †	51	—	1.5	3.0	15.0	22.5
1704526***	26	—	0.75	6.0	15.0	22.5
1704527***, †	26	—	1.5	6.0	15.0	45.0
1704530	2 or 4 preparative	—	0.75	46.0 or 97.0	15.0	172.5 or 364.0
	2 reference	—		6.0		22.5
1704531	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; 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, #1704525. 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

Ordering Information			UVTP Tray, cm				Combs		PowerPac™ Basic Power Supply (#1645050)
Catalog #	Casting Gates	Gel Caster	25 x 10	25 x 15*	25 x 20	25 x 25	26-Well	51-Well	
Sub-Cell Model 192 Systems									
1704508			•				•	•	
1704509	•			•			•	•	
1704510					•		•	•	
1704511						•	•	•	
1704504		•	•				•	•	
1704505	•	•		•			•	•	
1704506		•			•		•	•	
1704507		•				•	•	•	
1640306	•	•		•			•	•	•

Catalog # Description

Sub-Cell Model 192 Accessories

1704517	Model 192 Gel Caster
1704521	Model 96/192 UV-Transparent Gel Tray, 25 x 10 cm
1704522*	Model 96/192 UV-Transparent Gel Tray, 25 x 15 cm
1704523	Model 192 UV-Transparent Gel Tray, 25 x 20 cm
1704524	Model 192 UV-Transparent Gel Tray, 25 x 25 cm
1704520	Model 96/192 Gel Casting Gates, 2
1704518	Model 96/192 Anode (Red) Electrode Assembly
1704519	Model 96/192 Cathode (Black) Electrode Assembly
1704537	Model 96/192 Buffer Recirculation Kit, includes 2 recirculation port fittings, 6' Tygon tubing, 4 tubing clips

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**						
1704528***	51	—	0.75	3.0	15.0	11.2
1704529***, †	51	—	1.5	3.0	15.0	22.5
1704526***	26	—	0.75	6.0	15.0	22.5
1704527***, †	26	—	1.5	6.0	15.0	45.0
1704530	2 or 4 preparative	—	0.75	46.0 or 97.0	15.0	172.5 or 364.0
	2 reference			6.0		22.5
1704531	2 or 4 preparative	—	1.5	46.0 or 97.0	6.0	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, #1704525. Each system includes one comb holder.

*** Multichannel pipet-compatible.

† Combs included in systems.

See Also

Certified agaroses:
page 273.

Nucleic acid
reagents: page 271.

PowerPac Basic and
PowerPac HC power
supplies: page 167.

Premixed
electrophoresis
buffers: page 272.

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 (page 257). 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	2 x 8-Well	2 x 8-Well
Mini ReadyAgarose Gels, TBE			
1.0% plus ethidium bromide	1613004	1613010	—
3.0% plus ethidium bromide	1613006	1613012	—
Mini ReadyAgarose Gels, TAE			
1.0%	1613015	—	1613057
1.0% plus ethidium bromide	1613016	1613022	—
3.0%	1613017	—	—
3.0% plus ethidium bromide	1613018	1613024	—
	20-Well	32-Well	2 x 32-Well
Wide Mini ReadyAgarose Gels, TBE			
1.0% plus ethidium bromide	1613028	1613034	1613038
3.0% plus ethidium bromide	1613030	1613036	1613040
Wide Mini ReadyAgarose Gels, TAE			
1.0% plus ethidium bromide	1613044	1613050	1613054
3.0% plus ethidium bromide	1613046	1613052	1613056
ReadyAgarose 96 Plus Gels, TBE, 4 x 26-Well (96 Plus)			
1.0% plus ethidium bromide	1613060		
3.0% plus ethidium bromide	1613062		
ReadyAgarose 96 Plus Gels, TAE, 4 x 26-Well (96 Plus)			
1.0% plus ethidium bromide	1613063		
3.0% plus ethidium bromide	1613065		
Catalog #	Description		
ReadySub-Cell GT Cells for ReadyAgarose Gels			
1704487	Mini ReadySub-Cell GT Cell , includes buffer tank, lid and electrodes, leveling bubble; accommodates 8- and 12-well mini ReadyAgarose gels		
1704489	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		
1640303	Mini ReadySub-Cell GT Cell and PowerPac Basic Power Supply		
1640304	Wide Mini ReadySub-Cell GT Cell and PowerPac Basic Power Supply		

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 clamped homogenous electrical field (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 273), standards, and markers (page 269), buffers (page 204), and other reagents to make PFGE simple and convenient. See page 269 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°
- 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 AFGE 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*	
1703670	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, <i>S. cerevisiae</i> DNA size standards, two 0.5 A FB fuses, 5 g pulsed field Certified agarose, 5 g Certified megabase agarose, for North America
1703671	CHEF Mapper XA System , 100 V, for Japan
1703672	CHEF Mapper XA System , 220 V, for Asia Pacific/Europe
1703673	CHEF Mapper XA System , 240 V, for Asia Pacific/Europe

CHEF Mapper XA System*

* All accessories are compatible with CHEF Mapper, CHEF-DR II, and CHEF-DR III systems. Accessories can be found on page 268. A comprehensive listing of replacement parts can be found at www.bio-rad.com.

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° 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*	
1703700	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 <i>S. cerevisiae</i> DNA size standards, two 0.5 A FB fuses, 5 g pulsed field Certified agarose, 5 g Certified megabase agarose, for North America
1703702	CHEF-DR III Variable Angle System , 220/240 V, for Asia Pacific/Europe
1703703	CHEF-DR III Variable Angle System , 100 V, for Japan

CHEF-DR III Variable Angle System*

* All accessories are compatible with CHEF Mapper, CHEF-DR II, and CHEF-DR III systems. Accessories can be found on page 268. 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
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CHEF-DR II Chiller System*

1703725	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 <i>S. cerevisiae</i> DNA size standards, 5 g pulsed field Certified agarose, 5 g Certified megabase agarose, for North America
1703727	CHEF-DR II System , 220/240 V, for Asia Pacific/Europe
1703728	CHEF-DR II System , 100 V, for Japan

Accessories for Chef Mapper, CHEF-DR III, and CHEF-DR II Systems*

1703654	Cooling Module , 120 V, for North America
1703688	Cooling Module , 100 V, for Japan
1703655	Cooling Module , 220/240 V, for Asia Pacific/Europe
1703644	Variable-Speed Pump , 120 V
1703648	Electrodes , thick gauge (0.02"), 6
1703711	Screened Caps , 5
1703713	50-Well Disposable Plug Molds , enough for 250 plugs
1703622	Reusable Plug Mold , 10 plug
1703689	Standard Casting Stand , includes 14 x 13 cm frame and platform
1703704	Wide/Long Combination Casting Stand , includes 21 x 14 cm frame and platform
1703699	Combination Comb Holder
1704326	10-Well Adjustable-Height Comb , 1.5 mm
1704325	10-Well Adjustable-Height Comb , 0.75 mm
1704324	15-Well Adjustable-Height Comb , 1.5 mm
1704323	15-Well Adjustable-Height Comb , 0.75 mm
1704322	20-Well Adjustable-Height Comb , 1.5 mm
1704344	30-Well Adjustable-Height Comb , 1.5 mm
1703627	15-Well Comb , 21 cm wide, 1.5 mm thick
1703628	30-Well Comb , 21 cm wide, 1.5 mm thick
1703645	45-Well Comb , 21 cm wide, 1.5 mm thick
1703623	Preparative Comb , 14 cm wide, 1.5 mm thick, with 2 outer wells for size standards
1704046	Leveling Table , 20 x 30 cm
1703643	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

1703591	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
1703592	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
1703593	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
1703594	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 273 for agaroses, page 269 for size standards and 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.

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
<i>S. cerevisiae</i>	0.225–2.2 Mb	<i>Saccharomyces cerevisiae</i> chromosomal DNA	5 agarose blocks	25–40
<i>H. wingei</i>	1–3.1 Mb	<i>Hansenula wingei</i> chromosomal DNA	5 agarose blocks	25–40
<i>S. pombe</i>	3.5–5.7 Mb	<i>Schizosaccharomyces pombe</i> chromosomal DNA	5 agarose blocks	25–40

See Also

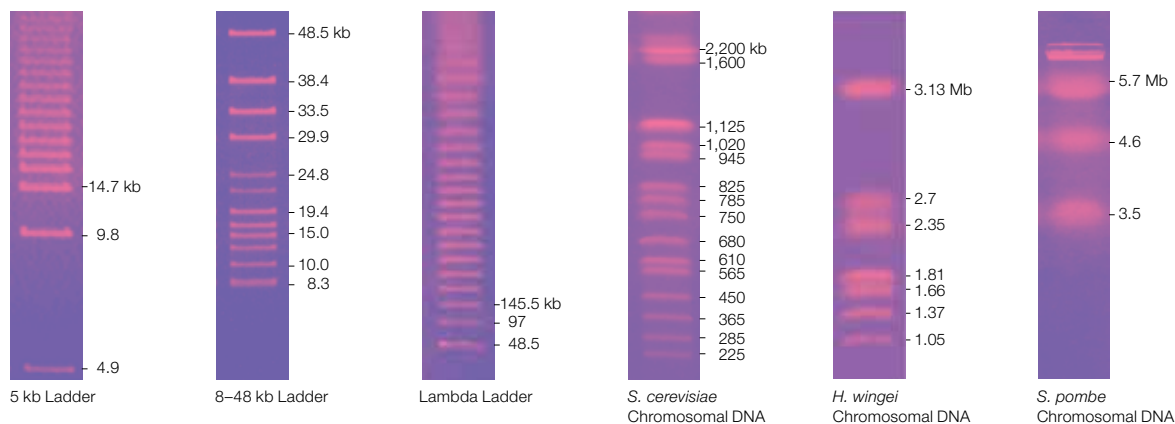
Pulsed field gel electrophoresis systems: page 265.

Imaging systems: page 290.

Bioinformatics software: page 302.

Certified agaroses: page 273.

Pulsed Field Standards



Ordering Information

Catalog # Description

Agaroses and Standards for Pulsed Field Gel Electrophoresis

1613108	Certified Megabase Agarose, 25 g
1613109	Certified Megabase Agarose, 125 g
1613110	Certified Megabase Agarose, 500 g
1613100	Certified Molecular Biology Agarose, 25 g
1613101	Certified Molecular Biology Agarose, 125 g
1613102	Certified Molecular Biology Agarose, 500 g
1620137	Pulsed Field Certified Agarose, 100 g
1620138	Pulsed Field Certified Agarose, 500 g

Premixed Nucleic Acid Electrophoresis Buffers

1610733	10x Tris/Boric Acid/EDTA (TBE), 1 L
1610770	10x Tris/Boric Acid/EDTA (TBE), 5 L cube
1610743	50x Tris/Acetic Acid/EDTA (TAE), 1 L
1610773	50x Tris/Acetic Acid/EDTA (TAE), 5 L cube

Pulsed Field Standards*

1703624	CHEF DNA Size Standard, 5 kb ladder, 4.9–120 kb, 20–25 lanes
1703707	CHEF DNA Size Standard, 8–48 kb, 125 lanes
1703635	CHEF DNA Size Standard, lambda ladder, 0.05–1 Mb, 5 agarose blocks, sufficient for 25–40 plugs

Pulsed Field Markers*

1703605	CHEF DNA Size Marker, <i>S. cerevisiae</i> , 0.2–2.2 Mb, 5 agarose blocks, sufficient for 25–40 plugs
1703667	CHEF DNA Size Marker, <i>H. wingei</i> , 1–3.1 Mb, 5 agarose blocks, sufficient for 25–40 plugs
1703633	CHEF DNA Size Marker, <i>S. pombe</i> , 3.5–5.7 Mb, 5 agarose blocks, sufficient for 25–40 plugs

* CHEF, clamped homogeneous electrical field. For more information, see page 265.

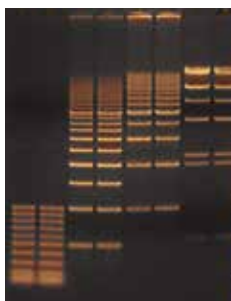
Buffers and Reagents for Nucleic Acid Electrophoresis

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
1610433	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
1610404	Bromophenol Blue , 10 g
1610423	Xylene Cyanol FF , 25 g

UView™ 6x Loading Dye

Eliminate the need for gel staining with this easy-to-use UView 6x loading dye. Because it also acts as an in-gel stain, it saves precious time.

- Loading dye plus in-gel stain
- Saves time
- Nontoxic
- UV detection

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



Nucleic Acid Electrophoresis and Blotting

Buffers and Reagents for Nucleic Acid Electrophoresis

www.bio-rad.com/dnareagents

Ordering Information

Catalog #	Description
1665111	UVView 6x Loading Dye, 0.2 ml
1665112	UVView 6x Loading Dye, 1 ml

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	
1610767	5x Nucleic Acid Sample Buffer, 10 ml
1610768	1x TBE-Urea Sample Buffer, 30 ml
Premixed Nucleic Acid Electrophoresis Buffers	
1610773	50x Tris/Acetic Acid/EDTA (TAE), 5 L cube
1610770	10x Tris/Boric Acid/EDTA (TBE), 5 L cube
1610741	10x Tris/Boric Acid/EDTA (TBE), extended range, 1 L bottle
1610743	50x Tris/Acetic Acid/EDTA (TAE), 1 L bottle
1610733	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 than 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 bp. 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	5 x 1 ml	1 x 5 ml	5 x 5 ml
Certified Agaroses for Standard Applications			
Certified molecular biology agarose	1613100	1613101	1613102
Certified PCR agarose	1613103	1613104	1613105
Certified low range ultra agarose	1613106	1613107	—
Certified megabase agarose	1613108	1613109	1613110
Certified low-melt agarose	1613111	1613112	—
Certified PCR low-melt agarose	1613113	1613114	1613115
Catalog #	Description		
1620137	Pulsed Field Certified Agarose, 100 g		
1620138	Pulsed Field Certified Agarose, 500 g		

See Also

DNA gel electrophoresis: page 256.
 Overlay agaroses: page 220.
 CleanCut agarose: page 269.
 CHEF genomic DNA plug kits: page 269.
 Buffers: page 272.

DNA Ladders

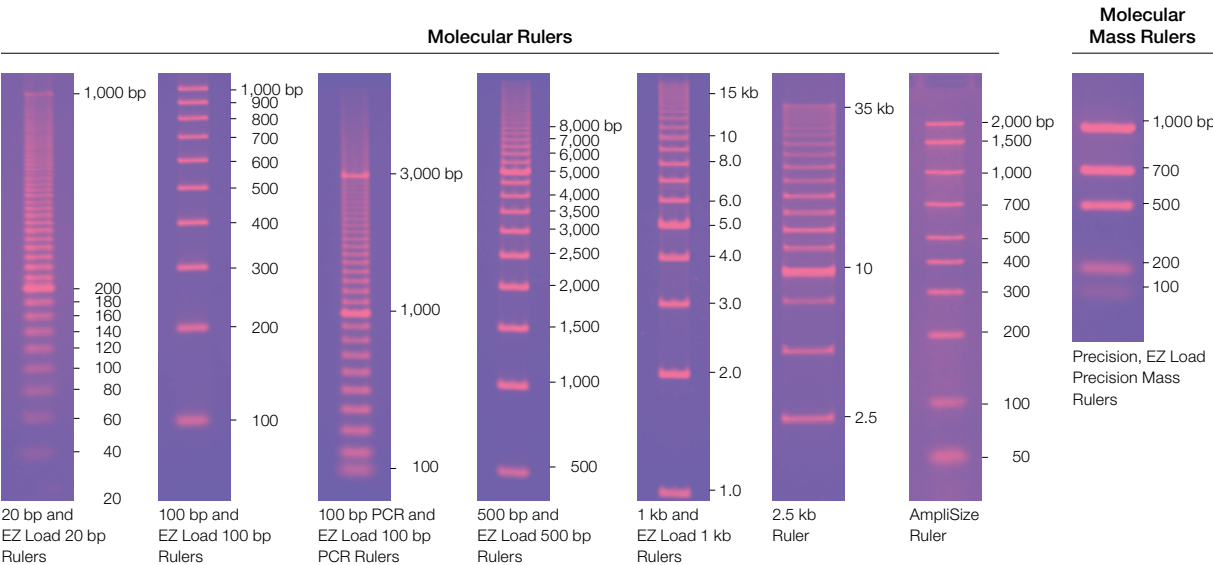
Bio-Rad offers a broad variety of DNA ladders for conventional DNA gel electrophoresis, including molecular rulers with evenly spaced banding patterns and EZ Load™ rulers premixed with loading buffer.

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

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
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20 bp Molecular Rulers

1708201	20 bp Molecular Ruler , 250 µl, 20–1,000 bp, 100 applications
1708351	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

1708202	100 bp Molecular Ruler , 250 µl, 100–1,000 bp, 100 applications
1708352	EZ Load 100 bp Molecular Ruler , 500 µl, 100–1,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications
1708206	100 bp PCR Molecular Ruler , 200 µl, 100–3,000 bp, 100 applications
1708353	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

1708203	500 bp Molecular Ruler , 200 µl, 500–8,000 bp, 100 applications
1708354	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

1708204	1 kb Molecular Ruler , 200 µl, 1–15 kb, 100 applications
1708355	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

1708205	2.5 kb Molecular Ruler , 400 µl, 2.5–35 kb, 100 applications
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AmpliSize Molecular Ruler

1708200	AmpliSize Molecular Ruler , 250 µl, 50–2,000 bp, 50 applications
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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
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1708207	Precision Molecular Mass Ruler , 250 µl, 100–1,000 bp, 10–100 ng, 100 applications
1708356	EZ Load Precision Molecular Mass Ruler , 500 µl, 100–1,000 bp, 10–100 ng, 100 applications

Northern and Southern Blotting

Premixed Blotting Buffers

Bio-Rad offers a complete line of reagents for preparation of buffers for your northern and Southern blot transfers.

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

1610774 20x SSC, 1 L
1610775 20x SSC, 5 L cube

Mutation Analysis

See Also

DNA amplification/PCR: page 358.

PowerPac Basic and PowerPac HV power supplies: page 167.

Acrylamide: page 207.

Premixed buffers: page 272.

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



Model 475 Gradient Delivery System

The 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 compatible) 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, #1709241) 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 more information on the DCode system and accessories, request or download bulletins: 2069 and 2100.

For complete ordering information, request or download bulletin: 2100

**Ordering Information**

Catalog #	Description
DCode Systems*	
1709080	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
1709081	DCode System for DGGE , 220/240 V, for 16 cm gels with single prep well (1 mm)
1709082	DCode System for DGGE , 100 V, for 16 cm gels with single prep well (1 mm)
1709088	DCode System for CDGE , 100 V, for 16 cm gels with 20 wells (1 mm)
1709091	DCode System for TTGE , 100 V, for 16 cm gels with 20 wells (1 mm)
1709105**	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
1709106**	Complete DCode System , 220/240 V, PC

DCode Systems*

1709080	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
1709081	DCode System for DGGE , 220/240 V, for 16 cm gels with single prep well (1 mm)
1709082	DCode System for DGGE , 100 V, for 16 cm gels with single prep well (1 mm)
1709088	DCode System for CDGE , 100 V, for 16 cm gels with 20 wells (1 mm)
1709091	DCode System for TTGE , 100 V, for 16 cm gels with 20 wells (1 mm)
1709105**	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
1709106**	Complete DCode System , 220/240 V, PC

continues

Nucleic Acid Electrophoresis and Blotting

Mutation Analysis

www.bio-rad.com/dnaelectro

Ordering Information

Catalog #	Description
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Adaptor Kits***

1709125	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
1709126	DGGE Kit , for 10 cm gels with 2 prep wells (1 mm)
1709127	CDGE/TTGE Kit , for 16 cm gels with 20 prep wells (1 mm)
1709128	Complete SSCP Kit , for 20 cm gels with 20 wells (0.75 mm), includes sandwich clamps, cooling finger adaptor for use with external chiller

Accessories†

1709240	WinMelt Software , PC/Windows
1709241	Interactive CD-ROM Training Guide
1709042	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

Electrophoresis Reagents and DNA Control Reagents

1709150	DCode Control Reagent Kit for DGGE/CDGE/TTGE , includes primers (one GC-clamped) and DNA templates for production of wild-type and mutant DNA
1709151	DCode Control Reagent Kit for SSCP , includes primers and DNA templates for production of wild-type and mutant DNA
1709170	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

* 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.

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](http://www.bio-rad.com/tech/experion)
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



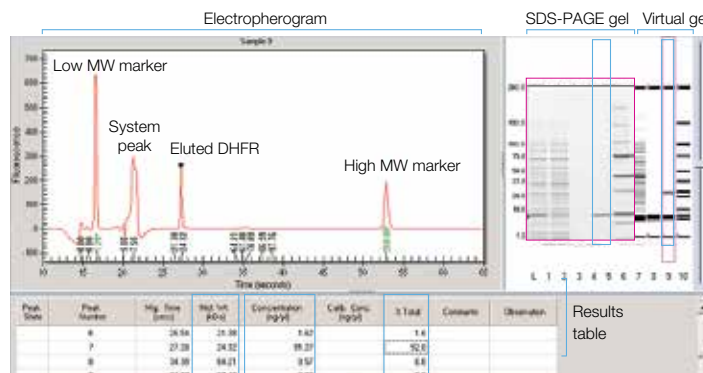
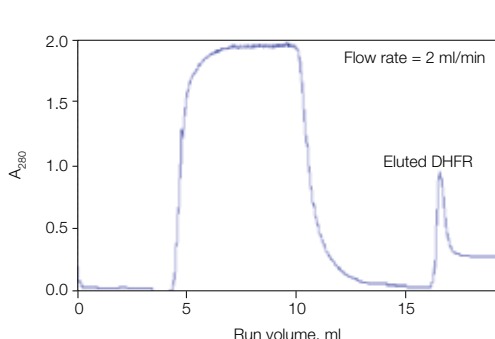
A Powerful Complement to Many Applications

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, 3174A, and 5520



Analysis of chromatographic fractions with the Experion system. Left, chromatogram showing purification of histidine-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.

See Also

Real-time PCR systems: page 371.
BioLogic DuoFlow systems: page 132.

Experion Automated Electrophoresis System

www.bio-rad.com/experion

Ordering Information

Catalog #	Description
7007000*	Experion System , 100–240 V, for protein analysis, includes electrophoresis station, priming station, software, USB2 cable
7017000*	Experion System , 100–240 V, for protein analysis, includes electrophoresis station, priming station, software, USB2 cable, Experion Pro260 starter kit
7007001	Experion System , 100–240 V, for RNA and DNA analyses, includes electrophoresis station, priming station, vortex station, software, USB2 cable
7017001	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

7007060*	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)
7007061*	Experion System with Dell Computer , 100–240 V, for protein analysis (without monitor; analysis kits sold separately)
7007062	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)
7007063	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
7007010	Experion Electrophoresis Station , 100–240 V, includes USB2 cable
7007022	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
7007030	Experion Priming Station , 100–240 V, includes 2 priming seals
7007031	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
7007043	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 and 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
7007050	Experion Software , system operation and standard data analysis tools, includes software CD-ROM
7007051	Experion Validation Kit , includes 3 test chips, qualification procedures, dongle for PC
7007052	Experion Software, Security Edition , standard and 21 CFR Part 11 compliance data analysis tools, includes 3 test chips, qualification procedures, dongle for PC

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, 3174A, 5520, and 5761

Experion Pro260 Analysis Kit

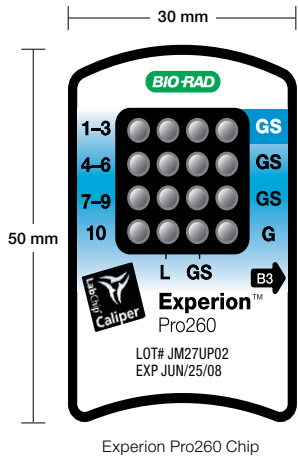
The Experion Pro260 analysis kit makes protein separation, sizing, and quantitation fast and easy. The Pro260 kit offers the ability to analyze ten protein samples (between 10–260 kD) in approximately 30 minutes. Accurate sizing is achieved with the Experion Pro260 ladder, part of the Precision Plus 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

See Also

Chromatography systems:
page 121.
Real-time PCR systems:
page 371.
Sample preparation products:
page 2.

Ordering Information

Catalog #	Description
7007101	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
7007102	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
7007103	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
7007104	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
7007105	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
7007106	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
7007107	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
7007108	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
7007307	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
7007308	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	
7007151	Experion Pro260 Chips , 10, plus 1 cleaning chip
7007152	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
7007153	Experion RNA StdSens Chips , 10, plus 2 cleaning chips
7007154	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
7007155	Experion RNA HighSens Chips , 10, plus 2 cleaning chips
7007156	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
7007163	Experion DNA Chips , 10, for DNA 1K and 12K analyses, plus 1 cleaning chip
7007164	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
7007165	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
7007251	Experion Cleaning Chips , 10
7007252	Experion Electrode Cleaner , 250 ml
7007253	Experion DEPC-Treated Water , 100 ml
7007254	Experion Spin Filters , 10
7007255	Experion RNA Ladder , 20 µl
7007256	Experion Pro260 Ladder , 60 µl
7007261	Experion DNA 1K Ladder , 20 µl
7007262	Experion DNA 12K Ladder , 20 µl
7007112	Experion Mouse Liver Total RNA Standard , 500 ng/µl, 20 µl
5000208	Bovine Gamma Globulin (BGG) Standard , 2 mg/ml, 2 ml
7007264	Cleaning Swabs , lint free, for electrode deep cleaning, 25
7007270	Experion Pro260 Sample Buffer , 400 µl, 2 vials
1632091	ReadyPrep Proteomics Grade Water , 500 ml
1610710	2-Mercaptoethanol , 25 ml
1610610	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 | ▪ Spin filters |
| ▪ Three Experion chips | ▪ Electrode cleaner |
| ▪ Cleaning chips | ▪ Cleaning swabs (lint free) |
| ▪ RNase-free tips | ▪ Control sample |
| ▪ RNase-free tubes | ▪ Detailed instruction manual |
| ▪ DEPC-treated water | ▪ CD-ROM with system introduction and chip loading video |
| ▪ DTT (protein kit only) | |



For More Information

Web: www.bio-rad.com/experionstarterkits

Request or download bulletin: 5732

Ordering Information

Catalog #	Description
7007110	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)
7007111	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)

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Antibodies

Antibodies

Coming Soon PrecisionAb™ Antibodies

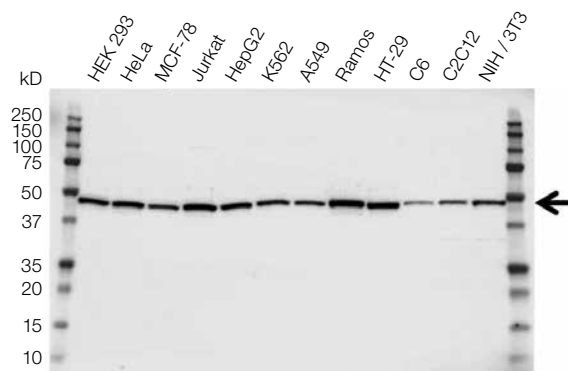
PrecisionAb antibodies are highly validated for western blot applications. Every antibody is screened using Bio-Rad's V3 Western Workflow™ against 12 whole cell lysates expressing endogenous protein levels. The stringent validation and quality-control procedures ensure that PrecisionAb antibodies deliver industry-leading quality and performance.

Product features include:

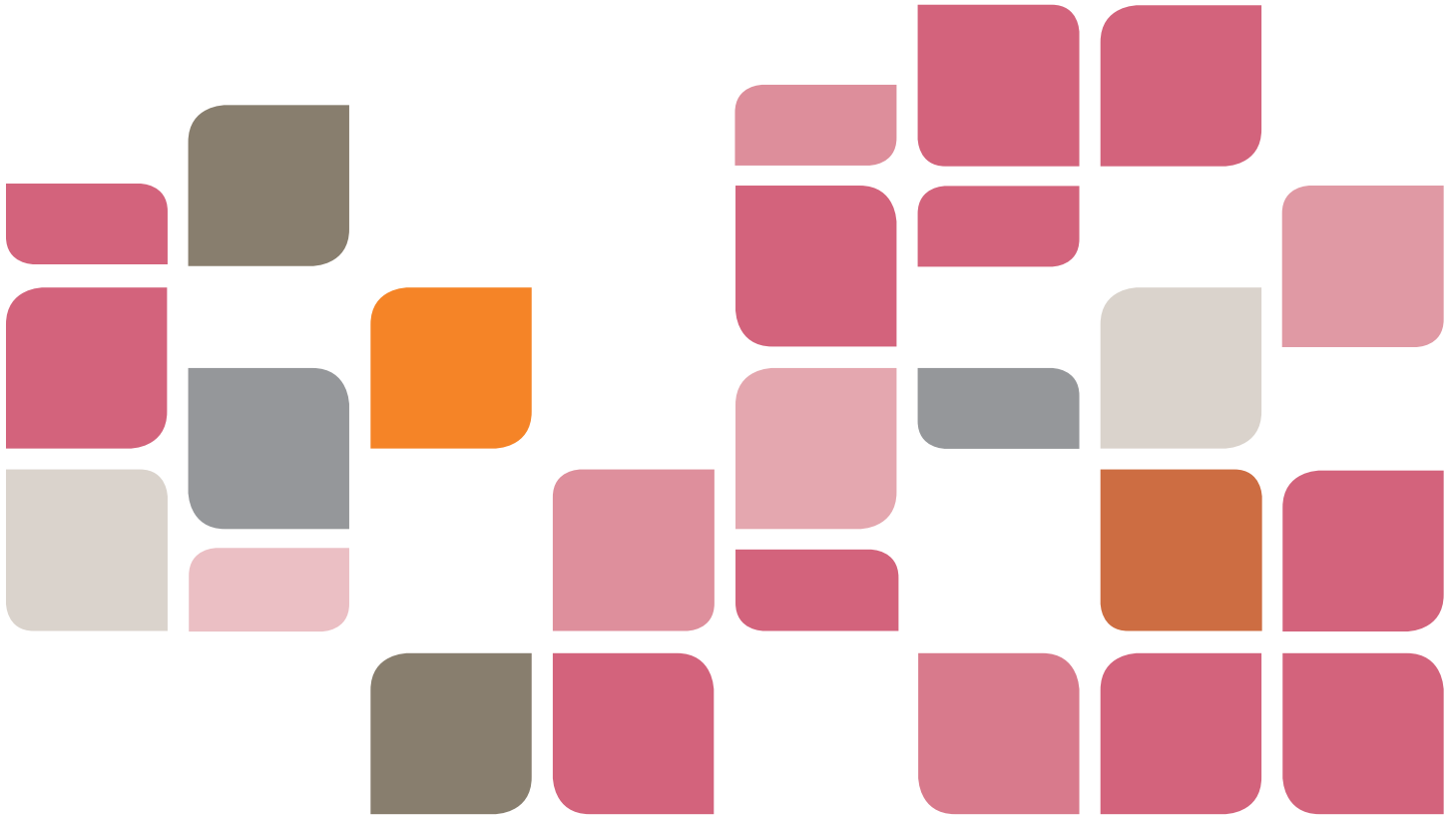
- **High specificity** – each antibody is heavily scrutinized to ensure that nonspecific binding is minimized and that the correct molecular weight is reported for the target protein
- **High sensitivity** – all PrecisionAb antibodies must meet strict criteria to produce the strongest signal in western blot applications
- **Reproducible performance** – stringent QC procedures guarantee that the antibodies exhibit strong lot-to-lot consistency
- **Trial kits for every antibody** – each PrecisionAb antibody will be available in a convenient two-western blot format for assessing antibody performance
- **Positive control lysate** – the positive control lysate can be used to validate western blot data and troubleshoot experimental procedures
- **Full antibody validation results and protocol** – the entire western blot will be displayed to give a full picture of the antibody performance. A validation protocol is also available to help optimize experimental conditions

For More Information

Web: www.bio-rad.com/PrecisionAb



Antibodies are validated against 12 whole cell lysates (not overexpressed proteins). This blot represents one such validation, with the arrow indicating the presence of FEN1 protein in the various cell lysates.








Imaging Instruments

Imaging Systems

Imaging systems detect images and quantitate colorimetric, chemiluminescent, and fluorescent signals. Bio-Rad offers software (page 302) 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](http://www.bio-rad.com/tech/proteinimaging)
Web: www.bio-rad.com/tech/proteinimaging

Imaging System Selection Guide

						
	ChemiDoc™ Touch	ChemiDoc MP	Gel Doc™ EZ	GS-900™ Densitometer	Gel Doc XR+	ChemiDoc XRS+
Application						
Nucleic Acid Detection						
Ethidium bromide stain	5	5	4	—	4	4
SYBR® Green I stain	5	5	4	—	4	4
SYBR® Safe stain	5	5	4	—	4	4
Fast Blast™ DNA stain	4	4	4	5	4	4
Protein Detection, 1-D Gels						
Stain-free gels	5	5	5	—	5	5
Coomassie Blue stain	4	4	4	5	4	4
Silver stain	4	4	4	5	4	4
SYPRO Ruby protein gel stain	4	4	4	—	4	4
Flamingo™ fluorescent gel stain	4	4	3	—	4	4
Oriole™ fluorescent gel stain	5	5	4	—	5	5
Protein Detection, 2-D Gels						
Coomassie Blue stain	4	4	3	5	3	3
Silver stain	4	4	3	5	3	3
SYPRO Ruby protein gel stain	4	4	3	—	3	3
Flamingo fluorescent gel stain	4	4	2	—	3	3
Oriole fluorescent gel stain	5	5	3	—	3	3
Pro-Q stain	4	4	2	—	2	3
Cy2, Cy3, Cy5 label	—	4	—	—	—	—
Blot Detection						
Stain-free blots	5	5	5	—	5	5
Coomassie Blue stain	5	4	—	5	4	4
Silver stain	5	5	—	5	4	4
SYPRO Ruby protein blot stain*	—	5	—	—	—	—
Chemiluminescence	5	5	—	—	—	4
Chemifluorescence*	1	5	—	—	1	1
Quantum dot*	2	5	2	—	2	2
Multiplex fluorescence	—	5	—	—	—	—
Micro- and Macroarray** Detection						
Radiolabel	—	—	—	—	—	—
Fluorescence	5	5	—	—	2	2
Chemiluminescence	5	5	—	—	—	4
Colony Counting						
Colorimetric detection	5	5	—	—	4	4
Fluorescence detection	5	5	—	—	4	4
Isotopic Detection						
Radiolabel	—	—	—	—	—	—
X-ray film	4	—	4	5	4	4

— Not recommended; 1–5, recommendation level (5 = highest).

* Optimal with low fluorescence PVDF membrane.

** With spot diameters ≥400 µm.

New ChemiDoc™ Touch Imaging System

The ChemiDoc Touch imaging system is the most sensitive instrument for gel or western blot imaging. Utilizing a compact design that integrates an intuitive touch screen with a powerful computer, it addresses chemiluminescence detection, stain-free fluorescence, and general gel documentation applications.

The system features best-in-class sensitivity and image quality, and a broad dynamic range. The touch-screen user interface running Image Lab™ Touch software is easy to use and learn and optimizes performance for fast, integrated, and automated image capture of various samples.



- **Multiple imaging capabilities** — accommodates a variety of sample types and detection methods, including chemiluminescence and stain-free fluorescence. It is well-suited for protein and DNA electrophoresis runs as well as western blotting experiments, delivering quantitative, reproducible results for fluorescence, chemiluminescence, and colorimetric detection
- **Stain-free technology** — UV-induced fluorescence labeling of proteins in the stain-free gels allows a 2 hr Coomassie gel-staining protocol to be condensed into a 5 min stain-and-image step. Stain-free gels can be used for western blotting. Using the V3 Western Workflow™, you can check your electrophoresis results and blot transfer quality prior to western blotting and apply total protein loading control in data normalization
- **High-sensitivity blot detection** — offers advanced detection technology that determines optimal exposure, even for faint or intense samples, and achieves superior sensitivity for chemiluminescence and colorimetric gel and blot documentation
- **Superior image quality** — exceptional dynamic range enables visualization of faint and intense bands on same blot or gel. Images are always in focus at any zoom level to ensure publication-ready images in seconds
- **Ease of use** — precalibrated system provides the precise focus for any zoom setting or sample height. Automated hands-free operation ensures consistent, reproducible, and high-throughput performance

For More Information

Web: www.bio-rad.com/chemidoc touch

Request or download bulletin: 6517

See Also

Stain-free gels:
pages 180, 190.
mini, midi formats

V3 Western Workflow:
page 233.

Trans-Blot Turbo
transfer system:
page 236.

Ordering Information

Catalog #	Description
1708370	ChemiDoc Touch Imager , includes internal computer, 12" touch screen display, camera, Image Lab software, chemi/UV/stain-free sample tray (#1708374); other sample trays available separately
1709690	Image Lab Software , stand-alone software, for 1-D analysis, compatible with PC or Mac
1708381	ChemiDoc Touch V3 Western Workflow for Mini Gels , includes ChemiDoc Touch imager with Image Lab software, UV/stain-free sample tray, 50 Mini-PROTEAN TGX Any kD Stain-Free precast gels, SDS-PAGE accessories, Mini-PROTEAN Tetra cell, Trans-Blot Turbo starter kit, 50 PVDF transfer packs for mini gels
1708382	ChemiDoc Touch V3 Western Workflow for Midi Gels , includes ChemiDoc Touch imager with Image Lab software, UV/stain-free sample tray, 50 4–20% Criterion TGX Stain-Free precast gels, SDS-PAGE accessories, Criterion cell, Trans-Blot Turbo starter kit, 50 PVDF transfer packs for midi gels

Accessories

1708372	White Sample Tray , for gels stained with Coomassie Blue, copper, silver, or zinc stains
1708373	Blue Sample Tray , for gels stained with GelGreen or any SYBR stain
1708374	Chemi/UV/Stain-Free Sample Tray , for chemiluminescent blots, stain-free gels/blots, and gels stained with ethidium bromide, SYPRO Ruby, Oriole, GelRed, and SYBR stains
1708375	UV Safety Shield , to protect against UV light exposure during band excision
1708376	Gel Alignment Templates , for consistent placement of gels and blots
1708377	Attenuation Tray , to reduce UV exposure to samples during excision of bands from gels; for use with ethidium bromide, SYBR stains, GelGreen, and GelRed
1708378	ChemiDoc Touch IQ/OQ Protocols , protocols for installation qualification/operational qualification
1708379	Band Excision Kit , includes attenuation tray (#1708377) and UV safety shield (#1708375)
1708380	ChemiDoc Touch Leveling Feet , ensures level imaging stage

See Also

Stain-free gels:
pages 180, 190,
mini, midi formats
V3 Western Workflow:
page 233.
Trans-Blot Turbo
transfer system:
page 236.

ChemiDoc™ MP Imaging System

The ChemiDoc MP imaging system is a full feature instrument for gel and western blot imaging. Its flexibility and sensitivity are complemented by simple, intuitive operation that integrates seamlessly into your workflow.

- **Versatility** — can be used for a variety of sample types or experiments that require differing detection methods, including multiplex fluorescence, chemiluminescence, and routine gel imaging, as well as for colorimetric gel and blot documentation
- **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. This technology provides an easy and quick total protein loading control for western blot data normalization
- **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
- **Image quality** — resolution remains high at any zoom level; 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
- **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
1708280	ChemiDoc MP Imaging System with Image Lab Software , compatible with PC or Mac, includes darkroom, UV transilluminator, epi-white illumination, camera, power supply, cables, Image Lab software
1708283	ChemiDoc MP Red LED Module Kit , for use with applications requiring red fluorophore detection, includes 2 epi-red LED modules, 1 red emission filter
1708284	ChemiDoc MP Green LED Module Kit , for use with applications requiring green fluorophore detection, includes 2 epi-green LED modules, 1 green emission filter
1708285	ChemiDoc MP Blue LED Module Kit , for use with applications requiring blue fluorophore detection, includes 2 epi-blue LED modules, 1 blue emission filter
1708294	ChemiDoc MP IQ/OQ , for use with Image Lab software
1708182	XcitaBlue Conversion Screen , includes view goggles; blue conversion screen for viewing SYBR Green, SYBR Safe, GFP, Flamingo, and other fluorescent gel stains
1708183	XcitaBlue Conversion Screen and Filter , includes view goggles and SYBR Safe filter #1708075; blue conversion screen for viewing SYBR Green, SYBR Safe, and other fluorescent gel stains
1708289	White Light Conversion Screen , for use with ChemiDoc MP, ChemiDoc XRS+, and Gel Doc XR+ systems
1706887	365 nm UV Lamps , 6 replacement bulbs
1708097	Standard 302 nm UV Lamps , 6 replacement bulbs
1708089	Mitsubishi Thermal Printer
1707581	Mitsubishi Thermal Printer Paper , 4 rolls, for use with Mitsubishi printer
1708184	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, 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
- **Stain-free technology** — convert a 2 hr Coomassie staining protocol into a 5 min visualization step, no staining required
- **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 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



UV Tray

For use with fluorescent stains such as ethidium bromide, SYBR®, Oriole™ fluorescent gel stain, GelRed, SYPRO Ruby, Coomassie Fluor Orange, and Krypton stains.



White Tray

For use with protein stains such as Coomassie Blue, copper, silver, and zinc stains.



Blue Tray

For use with nucleic acid stains such as GelGreen, SYBR® Green, SYBR® Safe, and SYBR® Gold 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
1708270	Gel Doc EZ Imaging System with Image Lab Software , compatible with PC or Mac, includes darkroom, camera, cables, Image Lab software; stain-free sample tray #1708274; other sample trays available separately
1708277	Gel Doc EZ IQ/OQ , for use with Image Lab software

Gel Doc EZ Sample Trays

1708271	UV Sample Tray , for gels using ultraviolet illumination
1708272	White Sample Tray , for gels stained with Coomassie Blue, copper, silver, or zinc stains
1708273	Blue Sample Tray , for gels stained with GelGreen or any SYBR stain
1708274	Stain-Free Sample Tray , for stain-free gels and blots
1708276	Sample Tray Holder , holds 4 sample trays

Accessories

1707581	Mitsubishi Thermal Printer Paper , 4 rolls, for use with Mitsubishi thermal printer
1708089	Mitsubishi Thermal Printer
1708097	Standard 302 nm UV Lamps , 6 replacement bulbs

See Also

Protein gel stains:
page 211.
Nucleic acid gel stain:
page 271.
Gel analysis software:
page 302.
ReadyAgarose precast
gel system: page 264.
Western blotting:
page 233.
Northern and
Southern blotting:
page 276.

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

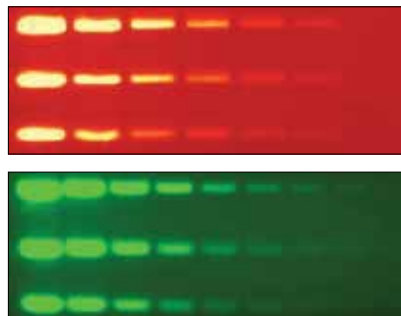
The Gel Doc XR+ system consists of a darkroom hood, CCD camera and software-controlled motorized optics, UV and white light illumination, filter slider with standard filter, and UV-protection shield. The system enables you to:

- Use stain-free technology to rapidly visualize proteins, allowing you to check electrophoresis results and transfer performance before western blotting, conserving precious samples and reducing waste
- 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



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 load is 51.2 ng. 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 sensitive 16-bit CCD camera that is cooled for detection of faint samples. The XRS+ system

is now compatible with stain-free technology, which offers checkpoints in western blot experiments and a convenient total protein loading control for data normalization.

For More Information

Web: www.bio-rad.com/imagingsystems
Request or download bulletin: 5837

See Also

Stain-free gels:
pages 180, 190.
mini, midi formats
V3 Western Workflow:
page 233.
Trans-Blot Turbo
transfer system:
page 236.

Ordering Information

Catalog #	Description
1708195	Gel Doc XR+ System with Image Lab Software , compatible with PC or Mac, includes darkroom, UV transilluminator, epi-white illumination standard filter, camera, cables, Image Lab software
1708193	Gel Doc XR+ IQ/OQ , for use with Image Lab software
1708265	ChemiDoc XRS+ System with Image Lab Software , compatible with PC or Mac, includes darkroom, UV transilluminator, epi-white illumination standard filter, camera, power supply, cables, Image Lab software
1708256	ChemiDoc XRS+ IQ/OQ , for use with Image Lab software
Accessories	
1708199	Gel Doc XR+ Installation Kit
1708299	ChemiDoc XRS+ Installation Kit
1708289	White Light Conversion Screen , for use with ChemiDoc MP, ChemiDoc XRS+, and Gel Doc XR+ systems
1708074	Filter , 520DF30, 62 mm, for SYBR Green I/GFP/SYBR Gold/fluorescein stain
1708075	Filter , 560DF50, 62 mm, for Cy3/rhodamine stains
1708076	Filter , 630BP30, 62 mm, for SYPRO Ruby/Texas Red stains
1708081	Filter , standard emission, 62 mm
1706887	365 nm UV Lamps , 6 replacement lamps
1708097	Standard 302 nm UV Lamps , 6 replacement bulbs
1708089	Mitsubishi Thermal Printer
1707581	Mitsubishi Thermal Printer Paper , 4 rolls, for use with Mitsubishi thermal printer
1708183	XcitaBlue Conversion Screen Kit , includes viewing goggles and standard detection filter
1708008	Orange Fluorescence Reference Plate
1703759	Bio-Rad Fluorescent Ruler
1703760	Gel Cutter Ruler
1708184	Gel Alignment Templates , pkg of 3, templates for aligning gels and blots, for use with ChemiDoc XRS+, ChemiDoc MP, and Gel Doc XR+ systems
1708026	Image Lab Focus Calibration Target

See Also

Fluorescent protein gel stains: page 213.

Nucleic acid stain: page 271.

Gel analysis software: page 302.

PharosFX™ and Personal Molecular Imager™ (PMI™) Systems Accessories

Accessories for the discontinued Pharos FX and PMI systems are still available and include replacement filters, external laser upgrades, sample trays, imaging screens, exposure cassettes, and screen erasers. For alternative imaging solutions, please see the imager selection guide (page 290) and ChemiDoc™ MP (page 292) for differential gel electrophoresis needs.

For More Information

Web: www.bio-rad.com/pharos



Ordering Information

Catalog #	Description
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Accessories for PharosFX and PharosFX Plus Systems

1707893	635 nm External Laser Upgrade, for #1707890, includes #1707865 filter
1707892	External Lasers, 488 and 635 nm, includes #1707865 filter
1707896	Filter 640 nm BP, for Texas Red dye
1709459	Filter 530 nm BP, for ECL Plus, AttoPhos, SYBR Green I, Alexa Fluor 488, FITC, Cy2, and Pro-Q Emerald dyes
1707866	Filter 605 nm BP, for ethidium bromide, SYPRO Red, SYPRO Ruby, Alexa Fluor 532 and 546, and Cy3 dyes
1707865	Filter 695 nm BP, for Cy5 and Alexa Fluor 635 dyes
1707863	Filter 555 nm LP, for Texas Red dye
1707867	Blank Filter Holder

Accessories for PharosFX, PharosFX Plus, and PMI Systems

1707811	Sample Tray
1707812	Multi-Sample Tray I, for small aluminum-mounted screens and microplates
1707814	Microplate Adaptor, for multi-sample tray I
1707819	Multi-Sample Tray II, for scanning gels mounted to glass plates

Accessories for PharosFX Plus and PMI Systems

1707843	Imaging Screen-K (Kodak), 20 x 25 cm
1707841	Imaging Screen-K (Kodak), 35 x 43 cm
1707861	Exposure Cassette-K, for 20 x 25 cm Kodak screen
1707862	Exposure Cassette-K, for 35 x 43 cm Kodak screen
1707809	Eraser Screen-K, 110/120 V
1707806	Eraser Screen-K, 220/240 V

GS-900™ USB Calibrated Densitometer

The GS-900 calibrated densitometer delivers superior accuracy, sensitivity, and data reproducibility. To ensure the accuracy of each scan, the GS-900 calibrated densitometer contains an internal optical density tablet, which is scanned and used for calibration before each run. Features include:

- Transmissive and reflective imaging using red, green, and blue CCD technology to optimally scan and quantitate colorimetric blots and gels treated with a variety of stains
- Accurate quantitation of samples over a large dynamic range (up to 3.4 OD) ensuring detection of both highly abundant and dilute proteins
- Scanning of larger gels for enhanced separation of proteins on oversized 29 x 33 cm imaging area
- IQ/OQ kit available for validation of the calibration functions using a NIST-traceable external target to confirm the accuracy of the internal target, guaranteeing accurate and reproducible results
- High resolution and analysis of closest bands on a gel due to 16-bit precision and 36.3 µm resolution
- Sealed imaging area 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 available

For More Information
Web: www.bio-rad.com/gs900
Request or download bulletin: 6385



See Also

Mini-format vertical electrophoresis: page 176.
Midi-format vertical electrophoresis: page 187.
Protein standards: page 170.
QC colloidal Coomassie stain: page 211.
Image Lab software: page 303.

Ordering Information

Catalog #	Description
1707991	GS-900 Calibrated Densitometry System , PC-compatible calibrated densitometer, cables, Image Lab software, Biologics Analysis Workflow Starter Kit (Criterion cell, Criterion TGX precast gels, Precision Plus Protein standards, QC colloidal Coomassie stain, buffers)
1707993	GS-900 Regulatory Tools Package , includes GS-900 IQ/OQ Kit and Image Lab Security Edition 21 CFR Part 11 module, 1 license
1707994	GS-900 IQ/OQ Kit , set of protocols for installation qualification/operational qualification and NIST-traceable external step tablet for the GS-900 calibrated densitometer

EXQuest™ Spot Cutter Accessories

Accessories for the discontinued EXQuest systems are still available and include cutting tips and sheets, accessories, and calibration tools.



Ordering Information

Catalog #	Description
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Accessories

1657202	Cutting Tip, 1.0 mm
1657203	Cutting Tip, 1.5 mm
1657204	Glass Bottle, 1 L
1657205	Calibration Pucks, 10
1657206	Membrane Cutting Head, with 1.0 mm tip
1657207	Membrane Cutting Tip, 1.0 mm
1657208	Gel Cutting Sheets, 15
1657209	Gel Holding Clips, 2 pair
1657210	Calibration Target
1657211	Camera Target
1657212	Micro Tubes, 1.5 ml, 20
1657214	Bottle Holder
1657215	Gel Tray
1657216	Transilluminator Lamp
1657217	Round-Bottom Microplates, 96-well, 20
1657218	Ferrule, 10–32, 1/16" OD, 10
1657219	Barcode Reader
1657220	Microplate Holder
1709630	PDQuest Advanced 2-D Analysis Software, 1 user license, 2-D analysis software provides advanced functionality

Subject Index

ChemiDoc™ MP Imaging System, 292
ChemiDoc™ Touch Imaging System, 291
EXQuest™ Spot Cutter Accessories, 298
Gel Doc™ EZ Imaging System, 293
Gel Doc™ XR+ and ChemiDoc™ XRS+ Systems, 294
GS-900™ USB Calibrated Densitometer, 297
PharosFX™ and Personal Molecular Imager™ (PMI™)
Systems Accessories, 296





Imaging and Analysis Software

Imaging and Analysis Software Overview

See Also

Imaging systems:
page 290.
Bio-Plex Manager
software:
page 312.
Microplate Manager
software: page 341.

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 quickly and easily. 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 dropdown menus, toolbars, and keyboard commands. File formats and menu commands are shared across programs, allowing easy switching between applications.

For information on instrument 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 303	PDQuest™, page 304
Image acquisition	•	—
Automated analysis	•	•
Automated imaging and analysis	•	—
1-D gel analysis	•	—
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 Imaging and Analysis Software System Minimum Requirements

Component	Image Lab 5.2	PDQuest
Operating system	Windows 7 (32- and 64-bit)/Windows 8 (64-bit), Mac OS X 10.9 Note: GS-900 is not compatible with Mac	Win XP Pro SP3 Win 7 (32-bit) Mac OSX 10.4, 10.5
Processor	Intel Core i3 or equivalent	Intel 2.0 GHz; Pentium 4, dual core or better (Windows) Power PC (Mac)
Hard disk space	60 GB	Minimum >20 GB; recommend ≥100 GB
System memory (RAM)	4 GB	Minimum 1 GB; recommend ≥2 GB
Screen resolution	1280 x 1024 or higher; 128 MB video RAM	1280 x 1024 or higher; 128 MB video RAM
USB port	1 free USB 2.0 port	1 free USB 2.0 port

Gel Analysis Software

Image Lab™ Software

Image Lab image acquisition and analysis software runs the Gel Doc™ EZ, Gel Doc XR+, ChemiDoc™ Touch, ChemiDoc XRS+, and ChemiDoc MP imaging systems as well as the GS-900™ calibrated densitometer. After the sample is loaded, an automated workflow captures an optimized gel or blot image, analyzes the gel or blot, and produces a comprehensive report in seconds. Image Lab software includes tutorials and requires no previous imaging experience to produce optimum gel and blot images. U.S. FDA 21 CFR Part 11 compliance is available with Image Lab Security Edition software.

Automated Workflow

- Executes preprogrammed and user-created protocols to perform from image capture, analysis, and printed reports with a single click of the mouse
- Simplifies and optimizes imaging and analysis to save 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 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 publication-quality images

Automated or Manual Data Analysis

- Automatically performs all the image analysis steps; 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 adjustments by the user in every step



Data analysis and reporting.

- Displays MW (or base pair) values and presents a quantitative comparison to evaluate sample purity and identify sample components for all bands and lanes

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. Provides various file formats for exporting images for publications and presentations.

For More Information

Web: www.bio-rad.com/imagelabsoftware

Ordering Information

Catalog #	Description
1709690	Image Lab Software , compatible with PC or Mac, for automated image capture, optimization, and 1-D gel or blot analysis, for use with Gel Doc EZ, Gel Doc XR+, ChemiDoc Touch, ChemiDoc XRS+, ChemiDoc MP, and GS-900 systems
1709691	Image Lab Software , Security Edition for 21 CFR Part 11 compliance, 1 license
1709692	Image Lab Software , Security Edition for 21 CFR Part 11 compliance, 5 licenses
1709693	Image Lab Software , Security Edition for 21 CFR Part 11 compliance, 10 licenses

See Also

2-D electrophoresis:
page 214.

PROTEAN i12 IEF
system:
page 214.

Second-dimension
electrophoresis
systems:
page 214.

2-D buffers and
reagents:
page 220.

PDQuest™ 2-D Analysis Software, Version 8.0

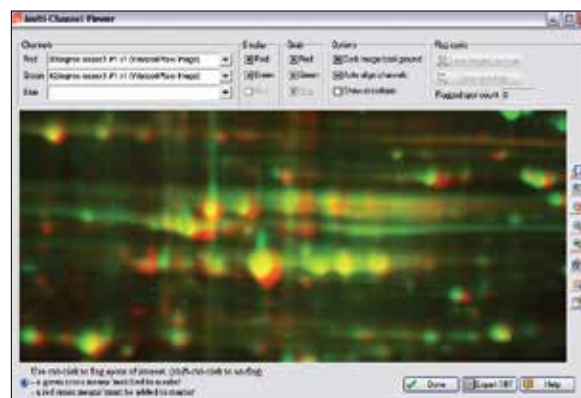
PDQuest software offers comprehensive and flexible 2-D gel analysis. Choose PDQuest Basic software for simple 2-D gel analysis or PDQuest Advanced software for comprehensive functionality used in 2-D gel-based expression proteomics studies. Whether you choose the basic or advanced version, the sophisticated 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 simplify the workflow through the major applications of the software, from image acquisition to output of analyzed data and spot cutting
- Onscreen, context-sensitive help
- 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)
- Compatible with Win 7 32-bit and Win XP Pro SP3 operating systems



Experiment wizards and image warping enable easy identification of differentially expressed proteins from 2-D gels.

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

For More Information

Web: www.bio-rad.com/pdquest

Request or download bulletin: 3121

Ordering Information

Catalog #	Description
1709630	PDQuest Advanced 2-D Analysis Software
1709631	PDQuest Advanced 1-User Network License
1709632	PDQuest Advanced 2-User Network License
1709633	PDQuest Advanced 3-User Network License
1709634	PDQuest Advanced 4-User Network License
1709635	PDQuest Advanced 5-User Network License
1709636	PDQuest Advanced 10-User Network License
1709640	PDQuest Basic to Advanced Software Version Upgrade
1709642	PDQuest User Guide
1709645	PDQuest Advanced CFR Module
1709620	PDQuest Basic 2-D Analysis Software
1709660	PDQuest Basic Software Version Upgrade, 7.x–8.0
1709670	PDQuest Advanced Software Version Upgrade, 7.x–8.0

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PDQuest™ 2-D Analysis Software, Version 8.0, 304



Bio-Plex® Multiplex System

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Bio-Plex Pro Human Cancer Biomarker Panels	329
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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

	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	Bio-Plex Manager™ MP*	Bio-Plex Manager	xPONENT
Analysis software	Bio-Plex Manager MP 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)

* Included in xPONENT automation module.

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:

- Automated instrument management software for exceptional reliability and optimized performance
- More data — up to 50 analytes per sample
- Simple and convenient workflow — easy to perform by researchers familiar with ELISA assays
- Bio-Plex Manager™ MP software that allows users to set up protocols, control the instrument, and effortlessly integrate with other Bio-Plex software packages such as Bio-Plex Data Pro™
- Improved multiplex productivity and convenience with magnetic bead-based assays



- Compact footprint to save bench space
- Affordable low-maintenance system

For More Information

Web: www.bio-rad.com/magpix
Request or download bulletin: 6005

Ordering Information

Catalog # Description

Kits and Reagents

171015001	Bio-Plex MAGPIX Multiplex Reader with Bio-Plex Manager MP Software , includes Bio-Plex MAGPIX instrument, PC with Bio-Plex Manager MP, Bio-Plex Manager 6.1 desktop license, calibration kit, verification kit, 2 drive fluid cartridges, 2 waste containers
171213003	Bio-Plex MAGPIX Drive Fluid , 4 x 700 ml drive fluid for use with Bio-Plex MAGPIX multiplex reader
171213001	Bio-Plex MAGPIX Calibration Kit , calibration kit good for 25 uses; kit includes 5 ml calibrator, microspheres, CD, pkg of 25 8-well strips
171213002	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 Upgrades

171051555	Bio-Plex Manager MP Software Upgrade , includes Bio-Plex Manager MP software, getting started guide, probe height adjustment plate, upgrade quick guide, and Bio-Plex Manager 6.1
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Bio-Plex MAGPIX Accessories

171012004	Bio-Plex MAGPIX Replacement Waste Fluid Container , pkg of 1, 850 ml container, holds waste fluid, for use with Bio-Plex MAGPIX reader
171012005	Bio-Plex MAGPIX Sample Probe , sample probe needle for use with Bio-Plex MAGPIX multiplex reader
171012006	Bio-Plex MAGPIX Sample Probe Height Adjustment Kit , sample probe height adjustment kit for use with Bio-Plex MAGPIX multiplex reader
171012008	Bio-Plex MAGPIX 96-Well Plate Heater Block , 96-well plate heater block for use with Bio-Plex MAGPIX multiplex reader
30034376	Bio-Plex Pro Wash Station , for magnetic bead-based assays, includes magnetic plate carrier, waste bottle, 2 liquid bottles
171020100	Bio-Plex Handheld Magnetic Washer , includes magnetic washer and adjustment hex tools for use in manual wash steps for all Bio-Plex magnetic assays
171061000	Bio-Plex Probe Height Adjustment Plate , replacement plate for Bio-Plex MAGPIX multiplex reader

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 Editions)



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
171000201	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
171000205	Bio-Plex 200 System with HTF , same as #171000201 with high-throughput fluidics (HTF)

Bio-Plex 200 Accessories and Replacement Parts

171203050	Bio-Plex Reservoir
171000055	Sheath Fluid , 1x, 20 L
171002001	Communication Cable , 5' DB9 cable, connects the microplate platform with the PC serial port
171002002	Communication Cable , 3' CAN BUS cable, connects the array reader with the HTF system
171002003	Communication Cable , 5' USB cable, connects the array reader with a PC USB port
171002010	Sheath Fluid Bottle , 1 L
171002012	Sheath Waste Bottle , 1 L
171002020	Sample Needle , 4.6" (11.6 cm)
171002024	Alignment Guide , aligns the array reader on the microplate platform
171002026	Needle Adjustment Wrench
171002030	Protective Shield for Sample Needle
171002032	Air Intake Filter
171002033	Syringe Seal
171002034	Syringe Seal with Cylinder
171002038	Sheath Fluid Filter with Quick Connect Tubing , removes particles >5 µm in diameter
171002040	Sheath Cube Filter , 10 µm, removes particles >10 µm in diameter
171002056	HTF Tubing , 10 µm, includes tubing, removes particles >10 µm in diameter
171002023	Needle Guide , allows sample needle access to microplates

Bio-Plex 200 System Performance Validation and Calibration Tools

171203001	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
171203033	Bio-Plex MCV Plate IV , for use with Bio-Plex Manager software, current version (Standard or Security Edition), and validation kit 4.0
171203060	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 and software
- Robotics interfacing capabilities
- Compatibility with magnetic or nonmagnetic assays
- Bio-Plex Manager™ software for data analysis
- On-site 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
BioPlex3D	Bio-Plex 3D Multiplex System , includes Bio-Plex 3D multiplex system, xPONENT acquisition software, PC, calibration and verification reagents, Bio-Plex Manager desktop license
892018500001*	xPONENT 21 CFR Part 11 Software Module , enables U.S. FDA 21 CFR Part 11 compliance
892018700001*	xPONENT Automation Module , enables interfacing with robotics workstations
171022001*	Swivel Base , allows rotation of the instrument away from the robotics workstation for maintenance and sample loading
892018600001*	xPONENT LIS Software Module , enables interfacing with LIMS/LIS databases
892018200001*	xPONENT Extra Seat Licenses , 3 additional seats of xPONENT software
171213004	Bio-Plex 3D Calibration Kit , good for 25 uses; includes reagents, CD, 25 stripwells
171213005	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 wash station streamlines 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



Bio-Plex Multiplex Suspension Array System

Instruments, Software, and Tools

www.bio-rad.com/bio-plex

The Bio-Plex Pro wash station incorporates a magnetic plate carrier for simple and reliable hands-free washing of 96-well plates.

Wash stations include preset wash programs that have been optimized for Bio-Plex assays.

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 (nonmagnetic)	—	•
xMAP microspheres (nonmagnetic)	—	•
Bio-Plex Pro assays (magnetic)	•	•
Bio-Plex® Precision Pro™ assays (magnetic)	•	•
MagPlex microspheres (magnetic)	•	•



Ordering Information

Catalog #	Description
30034376	Bio-Plex Pro Wash Station , includes magnetic plate carrier, waste bottle, 2 buffer bottles
171020100	Bio-Plex Handheld Magnetic Washer , includes magnetic washer and adjustment hex tools for washing all Bio-Plex magnetic assays

Accessories

171025001	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
171304500	Bio-Plex Wash Buffer , 1.5 L
171304502	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
171STND01	Bio-Plex Manager Software , includes 1-user desktop license, to analyze Bio-Plex data and generate protocols, does not operate the instrument
171STND05	Bio-Plex Manager Software , 5-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument
171STND10	Bio-Plex Manager Software , 10-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument
171STND25	Bio-Plex Manager Software , 25-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument
171STND50	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
171STND23	Bio-Plex Manager Software for IS 2.3 System , system license, most current version, for converting Luminex IS and xPONENT systems
171SUPG30	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 #171SCRT00)
171SUPG40	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 #171SCRT00)
171SUPG41	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 #171SCRT00)
171SUPG50	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 #171SCRT00)

Bio-Plex Multiplex Suspension Array System

Instruments, Software, and Tools

www.bio-rad.com/bio-plex

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:

- 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
171SCRT00	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
171SCRT01	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.
171SCRT05	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.
171SCRT10	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.
171SCRT25	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.
171SCRT50	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

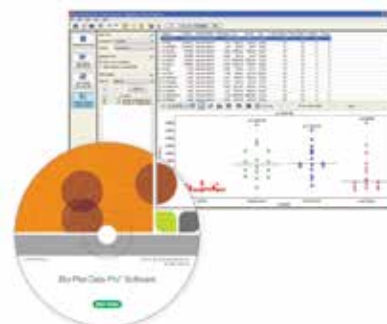
- Merge, import, sort, and filter data from multiple data sets

Automate Calculations

- Perform common calculations and statistical tests quickly and confidently

Visualize Results

- Present data clearly with customized graphs and tables



For More Information and to Download a Free Trial
Web: www.bio-rad.com/datapro

Ordering Information

Catalog #	Description
171001523	Bio-Plex Data Pro Plus Software , includes 5 Bio-Plex Data Pro Plus software licenses
171001513	Bio-Plex Data Pro Software , includes 5 Bio-Plex Data Pro software licenses

Bio-Plex® Assays

New Bio-Plex Pro™ Human MMP and TIMP Assays

The Bio-Plex Pro assays for human matrix metalloproteinases (MMPs) and tissue inhibitors of matrix metalloproteinases (TIMPs) consist of panels of 9 MMPs and 4 TIMPs.

MMPs degrade extracellular matrix proteins, whereas TIMPs work to inhibit the activity of MMPs. Studying MMPs and TIMPs together can reveal disruptions in the balance of activity between these two protein families, providing insights into complex disease states.

These immunoassays are built on magnetic beads to enable robust quantification of multiple proteins in human samples for research involving the following conditions and disease pathways:

Associated Research	Associated Pathways
Cancer	Inflammation
Cardiovascular disease	Metastasis
Infectious disease	Apoptosis
Autoimmune disease	Angiogenesis
Neurology	Tumor invasion
	Wound healing

Product features include:

- Single dilution factor protocol, measure 9 MMPs with less work
- Magnetic beads for simplified plate processing
- **Flexible ordering options** — order either premixed all-in-one kits or singleplex sets, or customize your assay with the Bio-Plex assay builder (www.bio-rad.com/assaybuilder)
- Single-level quality controls with lot-specific ranges
- Assay quick guide to get you started right away
- High-quality design for robust and reproducible measurements

For More Information

Web: www.bio-rad.com/bio-plexmmpsandtimps

Request or download bulletin: 6551

Analytes in the MMP Panel	Analytes in the TIMP Panel
MMP-1	TIMP-1
MMP-2	TIMP-2
MMP-3	TIMP-3
MMP-7	TIMP-4
MMP-8	
MMP-9	
MMP-10	
MMP-12	
MMP-13	

Ordering Information

Catalog # Description

Bio-Plex Pro Human MMP and TIMP Premixed AllinOne Kits

171AM001M	Bio-Plex Pro Human MMP Panel 9-Plex , 1 x 96-well, includes coupled magnetic capture beads, premixed detection antibodies, standards, quality controls, detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions, for the detection of MMP-1, MMP-2, MMP-3, MMP-7, MMP-8, MMP-9, MMP-10, MMP-12, and MMP-13
171AM002M	Bio-Plex Pro Human TIMP Panel 4-Plex , 1 x 96-well, includes coupled magnetic capture beads, premixed detection antibodies, standards, quality controls, detection antibody diluent HB, diluent HD, assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions, for the detection of TIMP-1, TIMP-2, TIMP-3, and TIMP-4

Bio-Plex Pro MMP Singleplex Sets

171BM001M	MMP-1 Set	171BM006M	MMP-9 Set
171BM002M	MMP-2 Set	171BM007M	MMP-10 Set
171BM003M	MMP-3 Set	171BM008M	MMP-12 Set
171BM004M	MMP-7 Set	171BM009M	MMP-13 Set
171BM005M	MMP-8 Set		

Standards

171DM0001	MMP Standard , 1 pkg of 1 vial, lyophilized mixture of 9 standard analytes: MMP-1, MMP-2, MMP-3, MMP-7, MMP-8, MMP-9, MMP-10, MMP-12, and MMP-13
171DM0501	MMP Standard , pkg of 50 lot-matched vials, lyophilized mixture of 9 standard analytes: MMP-1, MMP-2, MMP-3, MMP-7, MMP-8, MMP-9, MMP-10, MMP-12, and MMP-13

New Bio-Plex Pro™ RBM Human Metabolic and Hormone Panels

The Bio-Plex Pro RBM human metabolic and hormone panels, developed in partnership with Myriad RBM®, comprise a highly relevant set of biomarkers involved in diabetes, obesity, metabolic syndrome, cardiovascular disease, and hormonal control of metabolism and reproductive organs.

The assays are built on magnetic beads to enable robust quantification of multiple proteins in human serum, plasma, and cell culture media samples. Assays are offered as premixed all-in-one kits for research involving:

- Gut hormones and adipokines
- Pituitary hormones
- Diabetes, type I and type II
- Metabolic syndrome
- Obesity
- Cardiovascular disease
- Inflammation

Key features include:

- Analytically validated to standards set forth by the Clinical Laboratory Standards Institute (CLSI)
- Manufactured in accordance with GMP guidelines
- Lot-to-lot correlation specification of $R^2 \geq 0.9$ for consistently reproducible results
- 2-level quality controls with lot-specific ranges
- Assay quick guide to get you started right away
- Fastest available assay protocols and a convenient all-in-one kit format
- Magnetic beads for simplified plate processing

For More Information

Web: www.bio-rad.com/bio-plexmetabolic

Request or download bulletin: 6571

The Bio-Plex Pro RBM human metabolic and hormone assays are available in 7 panels:

Human Metabolic Panel 1	Human Metabolic Panel 2	Human Metabolic Panel 3	Human Metabolic Panel 4	Human Hormone Panel 1	Human IGFBP Panel	Human IGF Panel
C-Peptide	FGF-21	AAT	ANGPTL3	FSH	IGFBP-1	IGF-1
Cortisol	FGF-23	AGP-1	Chemerin	GH	IGFBP-2	IGF-2
Pancreatic polypeptide	Galectin-3	Hemopexin	DPP4	LH	IGFBP-3	
Proinsulin	sLeptin R	RBP-4	Protein S	Prolactin	IGFBP-4	
Peptide YY	Omentin-1	Transferrin	SEPP	TSH	IGFBP-5	
	Pentraxin-3	Transthyretin			IGFBP-6	
	PON-1	VDBP			IGFBP-7	
	Vaspin					

Ordering Information

Catalog # Description

Human Metabolic Premixed AllinOne Kits

- | | |
|-----------|--|
| 171AMR1CK | Bio-Plex Pro RBM Human Metabolic Panel 1 , 1 x 96-well, includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, sample dilution, and 10x assay), 10x streptavidin-PE, flat bottom plate/seals, and instructions, for the detection of C-Peptide, cortisol, pancreatic polypeptide, proinsulin, and peptide YY |
| 171AMR2CK | Bio-Plex Pro RBM Human Metabolic Panel 2 , 1 x 96-well, includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, sample dilution, and 10x assay), 10x streptavidin-PE, flat bottom plate/seals, and instructions, for the detection of FGF-21, FGF-23, galectin-3, sLeptin R, omentin-1, pentraxin-3, PON-1, and vaspin |
| 171AMR3CK | Bio-Plex Pro RBM Human Metabolic Panel 3 , 1 x 96-well, includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, sample dilution, and 10x assay), 10x streptavidin-PE, flat bottom plate/seals, and instructions, for the detection of AAT, AGP-1, hemopexin, RBP-4, transferrin, transthyretin, and VDBP |

continues

Ordering Information

Catalog #	Description
171AMR4CK	Bio-Plex Pro RBM Human Metabolic Panel 4 , 1 x 96-well, includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, sample dilution, and 10x assay), 10x streptavidin-PE, flat bottom plate/seals, and instructions, for the detection of ANGPTL3, chemerin, DPP4, protein S, and SEPP
171AHR1CK	Bio-Plex Pro RBM Human Hormone Panel 1 , 1 x 96-well, includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, sample dilution, and 10x assay), 10x streptavidin-PE, flat bottom plate/seals, and instructions, for the detection of FSH, GH, LH, prolactin, and TSH
171AGR1CK	Bio-Plex Pro RBM Human IGFBP Panel , 1 x 96-well, includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, sample dilution, and 10x assay), 10x streptavidin-PE, flat bottom plate/seals, and instructions, for the detection of IGFBP-1, IGFBP-2, IGFBP-3, IGFBP-4, IGFBP-5, IGFBP-6, and IGFBP-7
171AFR1CK	Bio-Plex Pro RBM Human IGF panel , 1 x 96-well, includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, sample dilution, and 10x assay), 10x streptavidin-PE, flat bottom plate/seals, and instructions, for the detection of IGF-1 and IGF-2

New Bio-Plex Pro™ Human Inflammation Assays

The Bio-Plex Pro human inflammation assays consist of 37 assays for biomarkers associated with inflammation pathways and consist of a 37-plex, 24-plex, and Treg cytokine 12-plex assay and 37 singleplex sets that can be combined for a custom multiplex kit.

The assays are built on magnetic beads to enable robust quantification of multiple proteins in human serum, plasma, and cell culture media samples. These assays are perfect for broad research applications, including academic and preclinical studies in:

- Inflammation
- Autoimmune diseases
- Cancer research

Key features include:

- **Reproducibility** — validated to meet analytical standards
- **Reliability** — lot-to-lot calibration with low variability
- **Speed to results** — Up to 1,480 data points in 4 hours
- **Flexible ordering options** — order either premixed all-in-one kits or 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/bio-plexhumaninflammation

Request or download bulletin: 6625

The Bio-Plex Pro human inflammation panel includes the following targets:

APRIL / TNFSF13	sIL-6Rα	IL-27 (p28)	Osteocalcin
BAFF / TNFSF13B	IL-8	IL-28A / IFN-λ2	Osteopontin
sCD30 / TNFRSF8	IL-10	IL-29 / IFN-λ1	Pentraxin-3
sCD163 Set	IL-11	IL-32	sTNFR-1
Chitinase 3-like 1	IL-12 (p40)	IL-34	sTNFR-2
gp130 / sIL-6Rβ	IL-12 (p70)	IL-35	TSLP
IFN-α2	IL-19	LIGHT / TNFSF14	TWEAK / TNFSF12
IFN-β	IL-20	MMP-1	
IFN-γ	IL-22	MMP-2	
IL-2	IL-26	MMP-3	

Bio-Plex Assays

Bio-Plex Pro Human Inflammation Assays

www.bio-rad.com/bio-plex

Ordering Information

Catalog # Description

BioPlex Pro Human Inflammation Premixed AllinOne Kits

171AL001M	Bio-Plex Pro Human Inflammation Panel 1, 37-Plex , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, control, buffers, diluents, streptavidin-PE, 96-well plate, and sealing tape, for the detection of 37 human inflammation biomarkers
171AL002M	Bio-Plex Pro Human Inflammation Panel 2, 24-Plex , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, control, buffers, diluents, streptavidin-PE, 96-well plate, and sealing tape, for the detection of 24 human inflammation biomarkers
171AL003M	Bio-Plex Pro Human Inflammation Treg Cytokine Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, control, buffers, diluents, streptavidin-PE, 96-well plate, and sealing tape, for the detection of 12 human Treg biomarkers

Bio-Plex Pro Human Inflammation Singleplex Sets

171BL001M	APRIL / TNFSF13 Set	171BL021M	IL-27 (p28) Set
171BL002M	BAFF / TNFSF13B Set	171BL022M	IL-28A / IFN-λ2 Set
171BL003M	sCD30 / TNFRSF8 Set	171BL023M	IL-29 / IFN-λ1 Set
171BL004M	sCD163 Set	171BL024M	IL-32 Set
171BL005M	Chitinase 3-like 1 Set	171BL025M	IL-34 Set
171BL006M	gp130 / sIL-6Rβ Set	171BL026M	IL-35 Set
171BL007M	IFN-α2 Set	171BL027M	LIGHT / TNFSF14 Set
171BL008M	IFN-β Set	171BL028M	MMP-1 Set
171BL009M	IFN-γ Set	171BL029M	MMP-2 Set
171BL010M	IL-2 Set	171BL030M	MMP-3 Set
171BL011M	sIL-6Rα Set	171BL031M	Osteocalcin Set
171BL012M	IL-8 Set	171BL032M	Osteopontin Set
171BL013M	IL-10 Set	171BL033M	Pentraxin-3 Set
171BL014M	IL-11 Set	171BL034M	sTNFR-1 Set
171BL015M	IL-12 (p40) Set	171BL035M	sTNFR-2 Set
171BL016M	IL-12 (p70) Set	171BL036M	TSLP Set
171BL017M	IL-19 Set	171BL037M	TWEAK / TNFSF12 Set
171BL018M	IL-20 Set	171DL0001	Std, 1PK
171BL019M	IL-22 Set	171DL0050	Std, 50PK
171BL020M	IL-26 Set		

Standards

171304090M	Bio-Plex Pro Reagent Kit III Flat Bottom Plate , 1 x 96-well, includes detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods
171DL0001	Bio-Plex Pro Human Inflammation Panel 1, 37-Plex Standard , pkg of 1 vial lyophilized mixture of 37 standard analytes
171DL0050	Bio-Plex Pro Human Inflammation Panel 1, 37-Plex Standard , pkg of 50 lot-matched vials, lyophilized mixture of 37 standard analytes

Bio-Plex Pro™ Cytokine, Chemokine, and Growth Factor 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.

Key features includes:

- **Magnetic beads** — automated plate washing and improved reproducibility across experiments
- **Increased productivity** — measure multiple analytes simultaneously, get results in about 3 hours
- **Flexible ordering options** — order either premixed all-in-one kits or 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

Human Assays

Human Assays — Available Analytes

6Ckine / CCL21	IL-1 α	IL-18	PDGF-BB
Basic FGF	IL-1 β *	IP-10 / CXCL10*	RANTES
BCA-1 / CXCL13	IL-1ra	I-TAC / CXCL11	SCF
CTACK / CCL27*	IL-2*	LIF	SCGF- β
ENA-78 / CXCL5	IL-2R α	MCP-1 / CCL2*	SCYB16 / CXCL16
Eotaxin / CCL11*	IL-3	MCP-2 / CCL8	SDF-1 α
Eotaxin-2 / CCL24	IL-4*	MCP-3 / CCL7*	SDF-1 α + β / CXCL12
Eotaxin-3 / CCL26	IL-5	MCP-4 / CCL13	TARC / CCL17
Fractalkine / CX3CL1	IL-6*	M-CSF	TECK / CCL25
GCP-2 / CXCL6	IL-7	MDC / CCL22	TGF- β 1
G-CSF	IL-8 / CXCL8*	MIF *	TGF- β 2
GM-CSF*	IL-9	MIG / CXCL9*	TGF- β 3
Gro- α / CXCL1*	IL-10*	MIP-1 α / CCL3 *	TNF- α *
Gro- β / CXCL2	IL-12 (p40)	MIP-1 β	TNF- β
HGF	IL-12 (p70)	MIP-1 δ / CCL15	TRAIL
I-309 / CCL1	IL-13	MIP-3 α / CCL20	VCAM-1
ICAM-1	IL-15	MIP-3 β / CCL19	VEGF
IFN- α 2	IL-16*	MPIF-1 / CCL23	
IFN- γ *	IL-17A	β -NGF	

* Analyte is present in multiple panels. If multiplexing, select analytes from the same panel to avoid cross reactivity.

Bio-Plex Assays

Bio-Plex Pro Magnetic Cytokine, Chemokine, and Growth Factor Assays

www.bio-rad.com/bio-plex

Ordering Information

Catalog # Description

Human Cytokine Premixed All-in-One Kits*

M50000007A	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, 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
M5000031YV	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12 (p70), IL-13, IL-17, G-CSF, GM-CSF, IFN- γ , MCP-1, MIP-1 β , TNF- α
MF0005KMII	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 α , IL-2R α , IL-3, IL-12 (p40), IL-16, IL-18, CTACK, GRO- α , HGF, IFN- α 2, LIF, MCP-3, M-CSF, MIF, MIG, β -NGF, SCF, SCGF- β , SDF-1 α , TNF- β , TRAIL
M500KCAFOY	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 β , IL-1ra, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-12 (p70), IL-13, IL-15, IL-17, basic FGF, eotaxin, G-CSF, GM-CSF, IFN- γ , IP-10, MCP-1, MIP-1 α , MIP-1 β , PDGF-BB, RANTES, TNF- α , VEGF
M5000005L3	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-2, IL-4, IL-5, IL-10, IL-12 (p70), IL-13, GM-CSF, IFN- γ , TNF- α

Bio-Plex Pro Human Cytokine Singleplex Sets, Group I**, 1 x 96-Well

171B5001M	IL-1 β Set	171B5015M	Eotaxin Set
171B5002M	IL-1ra Set	171B5016M	Basic FGF Set
171B5003M	IL-2 Set	171B5017M	G-CSF Set
171B5004M	IL-4 Set	171B5018M	GM-CSF Set
171B5005M	IL-5 Set	171B5019M	IFN- γ Set
171B5006M	IL-6 Set	171B5020M	IP-10 Set
171B5007M	IL-7 Set	171B5021M	MCP-1 Set
171B5008M	IL-8 Set	171B5022M	MIP-1 α Set
171B5009M	IL-9 Set	171B5023M	MIP-1 β Set
171B5010M	IL-10 Set	171B5024M	PDGF-BB Set
171B5011M	IL-12 (p70) Set	171B5025M	RANTES Set
171B5012M	IL-13 Set	171B5026M	TNF- α Set
171B5013M	IL-15 Set	171B5027M	VEGF Set
171B5014M	IL-17A Set		

Standards

171D50001	Bio-Plex Pro Human Cytokine Standards Group I , pkg of 1 vial, lyophilized mixture of 27 analytes
171D10501	Bio-Plex Pro Human Cytokine Standards Group I , pkg of 50 lot-matched vials, lyophilized mixture of 27 analytes

Bio-Plex Pro Human Cytokine Singleplex Sets, Group II**, 1 x 96-Well

171B6001M	IL-1 α Set	171B6012M	MCP-3 Set
171B6002M	IL-2R α Set	171B6013M	M-CSF Set
171B6003M	IL-3 Set	171B6014M	MIF Set
171B6004M	IL-12 (p40) Set	171B6015M	MIG Set
171B6005M	IL-16 Set	171B6016M	β -NGF Set
171B6006M	CTACK Set	171B6017M	SCF Set
171B6007M	GRO- α Set	171B6018M	SCGF- β Set
171B6008M	HGF Set	171B6019M	SDF-1 α Set
171B6009M	ICAM-1 Set	171B6020M	TNF- β Set
171B6010M	IFN- α 2 Set	171B6021M	TRAIL Set
171B6011M	LIF Set	171B6022M	VCAM-1 Set

Standards

171D60001	Bio-Plex Pro Human Cytokine Standards Group II , pkg of 1 vial, lyophilized mixture of 23 analytes
171D10502	Bio-Plex Pro Human Cytokine Standards Group II , pkg of 50 lot-matched vials, lyophilized mixture of 23 analytes

Reagent Kit — for use with human cytokine singleplex sets from groups I and II

171304070M	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, for magnetic separation methods
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* Please contact your local Bio-Rad Sales Representative for pricing and availability of 10 x 96-well assay kits.

** Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

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Ordering Information

Catalog # Description

Human Th17 Premixed All-in-One Kit

171AA001M **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-1 β , 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)

Bio-Plex Pro Human Th17 Cytokine Singleplex Sets**, 1 x 96-Well

171BA001M	IL-1 β	171BA009M	IL-23
171BA002M	IL-4	171BA010M	IL-25
171BA003M	IL-6	171BA011M	IL-31
171BA004M	IL-10	171BA012M	IL-33
171BA005M	IL-17A	171BA013M	IFN- γ
171BA006M	IL-17F	171BA014M	sCD40L
171BA007M	IL-21	171BA015M	TNF- α
171BA008M	IL-22	171BA016M	IL-17A/F**

Standards

171DA0001 **Bio-Plex Pro Human Th17 Cytokine Standard**, pkg of 1 vial, lyophilized mixture of 16 standard analytes
 171DA0501 **Bio-Plex Pro Human Th17 Cytokine Standard**, pkg of 50 lot-matched vials, lyophilized mixture of 16 standard analytes

Reagent Kit II — for use with human Th17 cytokine singleplex sets

171304055M **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

Human Chemokine Premixed All-in-One Kit

171AK99MR2 **Bio-Plex Pro Human Chemokine Panel 40-plex**, 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standards, single-level controls, detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions, for detecting 40 human chemokines shown below.

Bio-Plex Pro Human Cytokine Singleplex Sets, Group II**, 1 x 96-Well

171BK11MR2	6Ckine / CCL21 Set	171BK33MR2	IL-16 Set
171BK12MR2	BCA-1 / CXCL13 Set	171BK34MR2	IP-10 / CXCL10 Set
171BK13MR2	CTACK / CCL27 Set	171BK35MR2	I-TAC / CXCL11 Set
171BK14MR2	ENA-78 / CXCL5 Set	171BK36MR2	MCP-1 / CCL2 Set
171BK15MR2	Eotaxin / CCL11 Set	171BK37MR2	MCP-2 / CCL8 Set
171BK16MR2	Eotaxin-2 / CCL24 Set	171BK38MR2	MCP-3 / CCL7 Set
171BK17MR2	Eotaxin-3 / CCL26 Set	171BK39MR2	MCP-4 / CCL13 Set
171BK18MR2	Fractalkine / CX3CL1	171BK41MR2	MDC / CCL22 Set
171BK19MR2	GCP-2 / CXCL6 Set	171BK42MR2	MIF Set
171BK21MR2	GM-CSF Set	171BK43MR2	MIG / CXCL9 Set
171BK22MR2	Gro- α / CXCL1 Set	171BK44MR2	MIP-1 α / CCL3 Set
171BK23MR2	Gro- β / CXCL2 Set	171BK46MR2	MIP-1 δ / CCL15 Set
171BK24MR2	I-309 / CCL1 Set	171BK47MR2	MIP-3 α / CCL20 Set
171BK25MR2	IFN- γ Set	171BK48MR2	MIP-3 β / CCL19 Set
171BK26MR2	IL-1 β Set	171BK49MR2	MPIF-1 / CCL23 Set
171BK27MR2	IL-2 Set	171BK51MR2	SCYB16 / CXCL16 Set
171BK28MR2	IL-4 Set	171BK52MR2	SDF-1 α + β / CXCL12 Set
171BK29MR2	IL-6 Set	171BK53MR2	TARC / CCL17 Set
171BK31MR2	IL-8 / CXCL8 Set	171BK54MR2	TECK / CCL25 Set
171BK32MR2	IL-10 Set	171BK55MR2	TNF- α Set

Standards

171DK0001 **Bio-Plex Pro Human Chemokine Standard**, pkg of 1 vial, lyophilized mixture of 40 standard analytes
 171DK0050 **Bio-Plex Pro Human Chemokine Standard**, pkg of 50 lot-matched vials, lyophilized mixture of 40 standard analytes

Reagent Kit II — for use with human cytokine singleplex sets from groups I and II

171304090M **Bio-Plex Pro Reagent Kit III Flat Bottom Plate**, 1 x 96-well, includes detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods

** Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards.
 Singleplex sets should not be mixed with others from different panels or groups.

Bio-Plex Assays

Bio-Plex Pro Magnetic Cytokine, Chemokine, and Growth Factor Assays

www.bio-rad.com/bio-plex

Mouse Assays

Mouse Assays — Available Analytes

Basic FGF	IL-5	IL-22	MIP-1 α
CD40L	IL-6	IL-23 (p19)	MIP-1 β
Eotaxin	IL-9	IL-25 / IL-17E	MIP-2
G-CSF	IL-10	IL-27 (p28)	MIP-3 α
GM-CSF	IL-12 (p40)	IL-31	PDGF-BB
Gro / KC	IL-12 (p70)	IL-33	RANTES
IFN- γ	IL-13	ICAM-1	TGF- β 1
IL-1 α	IL-15	KC	TGF- β 2
IL-1 β	IL-17A	LIF	TGF- β 3
IL-2	IL-17F	MCP-1 / MCAF	TNF- α
IL-3	IL-18	M-CSF	VEGF
IL-4	IL-21	MIG	

Ordering Information

Catalog # Description

Mouse Cytokine Premixed All-in-One Kits*

M60000007A	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 β , IL-2, IL-4, IL-5, IL-10, GM-CSF, IFN- γ , TNF- α
MD000000EL	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, 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
M60009RDPD	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 α , IL-1 β , IL-2, IL-3, IL-4, IL-5, IL-6, IL-9, IL-10, IL-12 (p40), IL-12 (p70), IL-13, IL-17, eotaxin, G-CSF, GM-CSF, IFN- γ , KC, MCP-1, MIP-1 α , MIP-1 β , RANTES, TNF- α
M6000003J7	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-2, IL-4, IL-5, IL-10, IL-12 (p70), GM-CSF, IFN- γ , TNF- α
L6000004C6	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 β , IL-2, IL-6, IL-10, IL-12 (p70), IFN α , TNF- α
L60000UKVT	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, 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

Mouse Th17 Premixed All-in-One Kits

M6000007NY	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, flat bottom plate, sealing tape, standard diluent, sample diluent, and instructions, for the detection of IL-1 β , IL-6, IL-10, IL-17A, IFN- γ , TNF- α
171FA001M	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of CD40L, IL-17F, IL-21, IL-22, IL-23 (p19), IL-31, IL-33, MIP-3 α

* Please contact your local Bio-Rad Sales Representative for pricing and availability of 10 x 96-well assay kits.

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Ordering Information

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Mouse Cytokine Singleplex Sets, Group I*, 1 x 96-Well			
171G5001M	IL-1 α Set	171G5013M	IL-17A Set
171G5002M	IL-1 β Set	171G5014M	Eotaxin Set
171G5003M	IL-2 Set	171G5015M	G-CSF Set
171G5004M	IL-3 Set	171G5016M	GM-CSF Set
171G5005M	IL-4 Set	171G5017M	IFN- γ Set
171G5006M	IL-5 Set	171G5018M	KC Set
171G5007M	IL-6 Set	171G5019M	MCP-1 Set
171G5008M	IL-9 Set	171G5020M	MIP-1 α Set
171G5009M	IL-10 Set	171G5021M	MIP-1 β Set
171G5010M	IL-12 (p40) Set	171G5022M	RANTES Set
171G5011M	IL-12 (p70) Set	171G5023M	TNF- α Set
171G5012M	IL-13 Set		

Standards

171I50001	Bio-Plex Pro Mouse Cytokine Standards Group I, pkg of 1 vial, lyophilized mixture of 23 analytes
171I10501	Bio-Plex Pro Mouse Cytokine Standards Group I, pkg of 50 lot-matched vials, lyophilized mixture of 23 analytes

Bio-Plex Pro Mouse Cytokine Singleplex Sets, Group II*, 1 x 96-Well

171G6001M	IL-15 Set	171G6005M	MIG Set
171G6002M	Basic FGF Set	171G6006M	MIP-2 Set
171G6003M	LIF Set	171G6007M	PDGF-BB Set
171G6004M	M-CSF Set	171G6008M	VEGF Set

Standards

171I60001	Bio-Plex Pro Mouse Cytokine Standards Group II, pkg of 1 vial, lyophilized mixture of 9 analytes
171I10502	Bio-Plex Pro Mouse Cytokine Standards Group II, pkg of 50 lot-matched vials, lyophilized mixture of 9 analytes

Bio-Plex Pro Mouse Cytokine Singleplex Sets, Group III*, 1 x 96-Well

171GA001M	CD40L Set	171GA007M	IL-27 (p28) Set
171GA002M	IL-17F Set	171GA008M	IL-31 Set
171GA003M	IL-21 Set	171GA009M	IL-33 Set
171GA004M	IL-22 Set	171GA010M	ICAM-1 Set**
171GA005M	IL-23 (p19) Set	171GA011M	MIP-3 α Set
171GA006M	IL-25 Set		

Standards

171IA0001	Bio-Plex Pro Mouse Cytokine Standards Group III, pkg of 1 vial, lyophilized mixture for detecting 11 analytes
171IA0501	Bio-Plex Pro Mouse Cytokine Standards Group III, pkg of 50 lot-matched vials, lyophilized mixture for detecting 11 analytes

Reagent Kits – for use with mouse cytokine singleplex sets from Groups I, II, and III

171304070M	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, for magnetic separation methods
171304071	Bio-Plex Pro Reagent Kit , 10 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, sealing tape, standard diluent, sample diluent
171304080M	Bio-Plex Pro High Dilution Reagent Kit , 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent

* Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

** Requires high dilution reagent kit.

Bio-Plex Assays

Bio-Plex Pro Magnetic Cytokine, Chemokine, and Growth Factor Assays

www.bio-rad.com/bio-plex

Rat Assays

Rat Assays — Available Analytes

EPO	IL-4	IL-17A	RANTES
G-CSF	IL-5	IL-18*	TGF- β 1
GM-CSF	IL-6	KC	TGF- β 2
Gro / KC	IL-7	MCP-1	TGF- β 3
IFN- γ	IL-10	M-CSF	TNF- α
IL-1 α	IL-12 (p40)	MIP-1 α	VEGF
IL-1 β	IL-12 (p70)	MIP-2	
IL-2	IL-13	MIP-3 α	

* IL-18 is not available as a singleplex.

Ordering Information

Catalog #	Description
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Rat Cytokine Premixed All-in-One Kits*

171K1001M	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of EPO, G-CSF, GM-CSF, Gro/KC, IFN- γ , IL-1 α , IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-7, IL-10, IL-12 (p70), IL-13, IL-17A, IL-18, MCP-1, M-CSF, MIP-1 α , MIP-3 α , RANTES, TNF- α , VEGF
171K1002M	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, flat bottom plate, sealing tape, standard diluent, sample diluent and instructions, for the detection of IL- α , IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-10, IL-12 (p70), IL-13, GM-CSF, IFN- γ , TNF- α

Catalog #	Description
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Catalog #	Description
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Bio-Plex Pro Rat Cytokine Singleplex Sets**, 1 x 96-Well

171L1002M	EPO Set	171L1015M	IL-12 (p40) Set
171L1003M	G-CSF Set	171L1016M	IL-12 (p70) Set
171L1004M	GM-CSF Set	171L1017M	IL-13 Set
171L1005M	Gro / KC Set	171L1018M	IL-17A Set
171L1006M	IFN-γ Set	171L1020M	M-CSF Set
171L1007M	IL-1α Set	171L1027M	MCP-1 Set
171L1008M	IL-1β Set	171L1021M	MIP-1α Set
171L1009M	IL-2 Set	171L1022M	MIP-2 Set
171L1010M	IL-4 Set	171L1023M	MIP-3α Set
171L1011M	IL-5 Set	171L1024M	RANTES Set
171L1012M	IL-6 Set	171L1025M	TNF-α Set
171L1013M	IL-7 Set	171L1026M	VEGF Set
171L1014M	IL-10 Set		

Standards

171NZ0001	Bio-Plex Pro Rat Cytokine Standards , pkg of 1 vial, lyophilized mixture of 31 analytes. Compatible with rat cytokine and rat diabetes assays
171NZ0501	Bio-Plex Pro Rat Cytokine Standards , pkg of 50 lot-matched vials, lyophilized mixture of 31 rat analytes. Compatible with rat cytokine and rat diabetes assays

Reagent Kits — for use with human cytokine singleplex sets from groups I and II

171304070	Bio-Plex Pro Reagent Kit , 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, sealing tape, standard diluent, sample diluent, for vacuum separation methods
171304070M	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, for magnetic separation methods
171304071	Bio-Plex Pro Reagent Kit , 10 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, sealing tape, standard diluent, sample diluent

* Please contact your local Bio-Rad Sales Representative for pricing and availability of 10 x 96-well assay kits.

** Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards.
Singleplex sets should not be mixed with others from different panels or groups.

Multi-Species TGF-β Assays

Ordering Information

Catalog #	Description
Bio-Plex Pro TGF-β Premixed All-in-One Kit (compatible with Human, Mouse, and Rat samples)	
171W4001M	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, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of TGF-β1, TGF-β2, TGF-β3
Bio-Plex Pro TGF-β Singleplex Sets*, 1 x 96-Well	
171V4001M	TGF-β1 Set
171V4002M	TGF-β2 Set
171V4003M	TGF-β3 Set
Standards	
171X40001	Bio-Plex Pro TGF-β Standard , pkg of 1 vial, lyophilized standard for detecting TGF-β1, TGF-β2, and TGF-β3 analytes
171X40501	Bio-Plex Pro TGF-β Standard , pkg of 50 lot-matched vials, lyophilized standard for detecting TGF-β1, TGF-β2, and TGF-β3 analytes
Reagent Kits — for use with rat cytokine and TGF-β singleplex sets	
171304070	Bio-Plex Pro Reagent Kit , 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, sealing tape, standard diluent, sample diluent, for vacuum separation methods
171304070M	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, for magnetic separation methods
171304071	Bio-Plex Pro Reagent Kit , 10 x 96-well, includes assay buffer, wash buffer, detection standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of TGF-β1, TGF-β2, TGF-β3
Bio-Plex Pro Assay Accessories	
171304500	Bio-Plex Wash Buffer , 1.5 L
171025001	Bio-Plex Pro Flat Bottom Plates** , 40 x 96-well plates
171304502	Filter Plate , 1 x 96-well filter plate with clear plastic lid, plate-holder tray, sealing tape not included
* Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.	
** 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™ Cell Signaling Assays

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

Bio-Plex Assays

Bio-Plex Pro Cell Signaling Assays

www.bio-rad.com/bio-plex

Available Assays

Phosphoprotein		Lysate Control*	Catalog #
Akt (Ser ⁴⁷³) Akt (Thr ³⁰⁸) Erk1/2 (Thr ²⁰² /Tyr ²⁰⁴ , Thr ¹⁸⁵ /Tyr ¹⁸⁷)	GSK-3 α / β (Ser ²¹ /Ser ⁹) MEK1 (Ser ²¹⁷ /Ser ²²¹)	EGF-treated HEK-293	171-YZ0001
c-Jun (Ser ⁶³) JNK (Thr ¹⁸³ /Tyr ¹⁸⁵) p38 MAPK (Thr ¹⁸⁰ /Tyr ¹⁸²)	ATF-2 (Thr ⁷¹) CREB (Ser ¹³³) p53 (Ser ¹⁵)	UV-treated HEK-293	171-YZ0009
EGFR (Tyr ¹⁰⁶⁸)	EGFR (Tyr ¹¹⁷³)	EGF-treated HeLa	171-YZ0002
HER-2 (Tyr ¹²⁴⁸) HSP27 (Ser ⁷⁸)	p90 RSK (Ser ³⁸⁰) S6 ribosomal protein (Ser ²³⁵ /Ser ²³⁶)	EGF-treated SK-BR-3	171-YZ0003
IGF-1R (Tyr ¹¹³¹)	IR- β (Tyr ¹¹⁴⁶)	IGF-1-treated HEK-293	171-YZ0005
I κ B- α (Ser ³² /Ser ³⁶) NF- κ B p65 (Ser ⁵³⁶)	Smad2 (Ser ⁴⁶⁵ /Ser ⁴⁶⁷) IR- β (Tyr ¹¹⁴⁶)	TNF- α -treated HeLa	171-YZ0008
p70 S6 Kinase (Thr ⁴²¹ /Ser ⁴²⁴)	p70 S6 Kinase (Thr ³⁸⁹)	NGF β -treated PC-12	171-YZ0006
PDGFR- α (Tyr ⁷⁵⁴) PDGFR- β (Tyr ⁷⁵¹) BAD (Ser ¹³⁶)	IRS-1 (Ser ⁶³⁶ /Ser ⁶³⁹) mTOR (Ser ²⁴⁴⁸) PTEN (Ser ³⁸⁰)	PDGF-treated NIH3T3	171-YZ0007
Stat1 (Tyr ⁷⁰¹) Stat3 (Ser ⁷²⁷) VEGFR-2 (Tyr ¹¹⁷⁵)	Stat3 (Tyr ⁷⁰⁵)	IFN- α -treated HeLa	171-YZ0004
ZAP-70 (Tyr ³¹⁹)		VEGF-treated HUVEC	171-YZ0010
Btk (Tyr ²²³) Lyn (Tyr ⁵⁰⁷)	PI3K p85 (Tyr ⁴⁵⁸) Syk (Tyr ³⁵²)	H ₂ O ₂ -treated Jurkat	171-YZ0012
c-Abl (Tyr ²⁴⁵) Src (Tyr ⁴¹⁶)		H ₂ O ₂ -treated Ramos	171-YZ0011
		Untreated K-562	171-YZT003
		Src-transfected NIH3T3	171-YZ0013
Negative control for all phosphoprotein assays		Phosphatase-treated HeLa	171-YZB001
Total Target		Lysate Control*	Catalog #
Total Akt Total Erk 1/2 Total GSK-3 β Total I κ B- α	Total JNK Total MEK1 Total mTOR Total p38 MAPK	Total p70 S6 Kinase Total PTEN Total Smad2 Total IGF-1R	Untreated HeLa
Total c-Jun Total CREB			Untreated HEK-293
Total Src			171-YZT001
Total Btk			Src-transfected NIH3T3
Total ZAP-70			171-YZ0013
Total HER-2			H ₂ O ₂ -treated Ramos
Negative control for all target assays			171-YZ0011
			H ₂ O ₂ -treated Jurkat
			171-YZ0012
			EFG-treated SK-BR-3
			171-YZ0003
			Detection antibody diluent
Housekeeping Protein		Lysate Control*	Catalog #
Human GAPDH		Untreated HeLa	171-YZT002
β -Actin		Untreated HeLa	171-YZT002
Negative control for all 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 (#171304006M).

For More Information

Web: www.bio-rad.com/cellsignalingassays

Request or download bulletins: 5405 and 5483

Ordering Information

Catalog #	Description
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Premixed All-in-One Kits

LQ00006JKOK0RR

LQ00000S6KL81S

Bio-Plex Pro Cell Signaling Akt Panel 8-Plex Assay, 1 x 96-well

Bio-Plex Pro Cell Signaling MAPK Panel 9-Plex Assay, 1 x 96-well

continues

Ordering Information

Catalog #	Phosphoprotein	Catalog #	Phosphoprotein
Phosphoprotein Singleplex Sets*			
171V50001M	Akt (Ser ⁴⁷³)	171V50033M	mTOR (Ser ²⁴⁴)
171V50002M	Akt (Thr ³⁰⁸)	171V50013M	NF-κB p65 (Ser ⁵³⁶)
171V50024M	ATF-2 (Thr ⁷¹)	171V50014M	p38 MAPK (Thr ¹⁸⁰ /Tyr ¹⁸²)
171V50025M	BAD (Tyr ²²³)	171V50034M	p53 (Ser ¹⁵)
171V50026M	Btk (Tyr ²²³)	171V50016M	p70 S6 kinase (Thr ³⁸⁹)
171V50027M	c-Abl (Tyr ²⁴⁵)	171V50015M	p70 S6 kinase (Thr ⁴²¹ /Ser ⁴²⁴)
171V50003M	c-Jun (Ser ⁶³)	171V50035M	p90 RSK (Ser ³⁸⁰)
171V50028M	CREB (Ser ¹³³)	171V50017M	PDGFR-α (Tyr ⁷⁵⁴)
171V50004M	EGFR (Tyr ¹⁰⁶⁸)	171V50018M	PDGFR-β (Tyr ⁷⁵¹)
171V50005M	EGFR (Tyr ¹¹⁷³)	171V50036M	PI3K p85 (Tyr ⁴⁵⁸)
171V50006M	Erk 1/2 (Thr ²⁰² /Tyr ²⁰⁴ , Thr ¹⁸⁵ /Tyr ¹⁸⁷)	171V50037M	PTEN (Ser ³⁸⁰)
171V50007M	GSK-3α/β (Ser ²¹ /Ser ⁹)	171V50038M	S6 ribosomal protein (Ser ²³⁵ /Ser ²³⁶)
171V50008M	HER-2 (Tyr ¹²⁴⁸)	171V50019M	Smad2 (Ser ⁴⁶⁵ /Ser ⁴⁶⁷)
171V50029M	HSP27 (Ser ⁷⁸)	171V50039M	Src (Tyr ⁴¹⁶)
171V50009M	IGF-1R (Tyr ¹¹³¹)	171V50020M	Stat1 (Tyr ⁷⁰¹)
171V50031M	IR-β (Tyr ¹¹⁴⁶)	171V50021M	Stat3 (Ser ⁷²⁷)
171V50030M	IRS-1 (Ser ⁶³⁶ /Ser ⁶³⁹)	171V50022M	Stat3 (Tyr ⁷⁰⁵)
171V50010M	IκB-α (Ser ³² /Ser ³⁶)	171V50040M	Syk (Tyr ³⁵²)
171V50011M	JNK (Thr ¹⁸³ /Tyr ¹⁸⁵)	171V50023M	VEGFR-2 (Tyr ¹¹⁷⁵)
171V50032M	Lyn (Tyr ⁵⁰⁷)	171V50041M	ZAP-70 (Tyr ³¹⁹)
171V50012M	MEK1 (Ser ²¹⁷ /Ser ²²¹)		
Total Target Singleplex Sets*			
171V60001M	Akt	171V60007M	JNK
171V60012M	Btk	171V60008M	MEK1
171V60002M	c-Jun	171V60015M	mTOR
171V60013M	CREB	171V60009M	p38 MAPK
171V60003M	Erk1/2	171V60010M	p70 S6 kinase
171V60004M	GSK-3β	171V60016M	PTEN
171V60005M	HER-2	171V60011M	Smad2
171V60014M	IGF-1R	171V60017M	Src
171V60006M	IκB-α	171V60018M	ZAP-70
Housekeeping Protein Singleplex Sets*			
171V60019M	Human GAPDH	171V60020M	β-Actin

Bio-Plex Pro Cell Signaling Reagents — cell signaling reagent kits are required to run the singleplex sets

171304006M	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
171304515	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

* Lysate controls are recommended for singleplex sets.

Bio-Plex Pro™ RBM Apoptosis Assays

Apoptosis Assays

The Bio-Plex Pro RBM apoptosis assays, developed in partnership with Myriad RBM, comprise a highly relevant set of intracellular proteins involved in the commitment, onset, and induction of apoptosis by the intrinsic pathway. The assays are built on magnetic beads to enable robust quantification of multiple proteins in cell and tissue lysates, and are available as premixed all-in-one kits.



Bio-Plex Assays

Bio-Plex RBM Kidney Toxicity Assays

www.bio-rad.com/bio-plex

Key features include:

- Analytically validated to standards set forth by the Clinical Laboratory Standards Institute (CLSI)
- Manufactured in accordance with GMP guidelines
- Lot-to-lot correlation specification of $R^2 \geq 0.9$ for consistently reproducible results
- 2-level quality controls with lot-specific ranges
- Assay quick guide to get you started right away

- Fastest available assay protocols and a convenient all-in-one kit format
- Magnetic beads for simplified plate processing

Available Bio-Plex Pro RBM Apoptosis Analytes

Panel 1	Panel 2	Panel 3
Bak	Bad	Bcl-xL / Bak dimer
Bax	Bax / Bcl-2 dimer	Caspase-3
Lamin B	Bcl-xL	Mcl-1 / Bak dimer
Smac	Bim	Survivin
	Mcl-1	

Ordering Information

Catalog #	Description
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Bio-Plex Pro RBM Apoptosis Assays

171WAR1CK	Bio-Plex Pro RBM Apoptosis Panel 1 , 1 x 96-well all-in-one kit that includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, lysate dilution (LDB), cytosolic extraction (CEB), 10x assay), 10x streptavidin-PE, flat bottom plate, plate seals, and instructions, for the detection of the following analytes in cell and tissue lysates: Bak, Bax, Lamin B, and Smac
171WAR2CK	Bio-Plex Pro RBM Apoptosis Panel 2 , 1 x 96-well all-in-one kit that includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, lysate dilution (LDB), cytosolic extraction (CEB), 10x assay), 10x streptavidin-PE, flat bottom plate, plate seals, and instructions, for the detection of the following analytes in cell and tissue lysates: Bad, Bax / Bcl-2 dimer, Bcl-xL, Bim, and Mcl-1
171WAR3CK	Bio-Plex Pro RBM Apoptosis Panel 3 , 1 x 96-well all-in-one kit that includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, lysate dilution (LDB), cytosolic extraction (CEB), 10x assay), 10x streptavidin-PE, flat bottom plate, plate seals, and instructions, for the detection of the following analytes in cell and tissue lysates: active caspase-3, Bcl-xL / Bak dimer, Mcl-1 / Bak dimer, and survivin

Bio-Plex Pro™ RBM Kidney Toxicity Assays

Kidney Toxicity Assays

The Bio-Plex Pro RBM kidney toxicity assays, developed in partnership with Myriad RBM, comprise a highly relevant set of biomarkers for early detection and characterization of kidney toxicity/injury.

The assays are built on magnetic beads to enable robust quantification of multiple proteins in human, canine, and rat urine samples.

Key features include:

- Analytically validated to standards set forth by the Clinical Laboratory Standards Institute (CLSI)
- Manufactured in accordance with GMP guidelines
- Lot-to-lot correlation specification of $R^2 \geq 0.9$ for consistently reproducible results

- 2-level quality controls with lot-specific ranges
- Assay quick guide to get you started right away
- Fastest available assay protocols and a convenient all-in-one kit format
- Magnetic beads for simplified plate processing



Ordering Information

Catalog #	Description
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Bio-Plex Pro RBM Kidney Toxicity Assays

171ATR1CK	Bio-Plex Pro RBM Human Kidney Toxicity Panel 1 , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of the following analytes: calbindin, clusterin, GST- π , IL-18, KIM-1, MCP-1
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Ordering Information

Catalog # Description

Bio-Plex Pro RBM Kidney Toxicity Assays (cont.)

171ATR2CK	Bio-Plex Pro RBM Human Kidney Toxicity Panel 2 , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of the following analytes: albumin, B2M, cystatin C, NGAL, osteopontin, TFF3
171QTR1CK	Bio-Plex Pro RBM Canine Kidney Toxicity Panel 1 , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of the following analytes: clusterin, KIM-1, MCP-1, NGAL
171QTR2CK	Bio-Plex Pro RBM Canine Kidney Toxicity Albumin Kit , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of albumin
171KTR1CK	Bio-Plex Pro RBM Rat Kidney Toxicity Panel 1 , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of the following analytes: clusterin, IL-18, KIM-1, MCP-1, osteopontin
171KTR2CK	Bio-Plex Pro RBM Rat Kidney Toxicity Panel 2 , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of the following analytes: B2M, calbindin, cystatin C, NGAL
171KTR3CK	Bio-Plex Pro RBM Rat Kidney Toxicity Albumin Kit , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of albumin

Bio-Plex Pro™ Human Cancer Biomarker Panels

Human Cancer Biomarker Panels

Bio-Plex Pro human cancer biomarker panels are a unique blend of magnetic bead-based assays designed to meet the needs of the most discerning 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 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** — to get you started right away
- **2-level quality controls** — included with premixed kits
- **Robustness** — tested in serum, plasma, and other biological fluids



- **Convenience** — all-in-one kit format
- **Compatible** — with Bio-Plex™ 200, Bio-Plex 3D, and Bio-Plex® MAGPIX™ systems

For More Information

Web: www.bio-rad.com/bio-plexprocancer

Request or download bulletins: 6156 and 6159

Bio-Plex Assays

Bio-Plex Pro Human Cancer Biomarker Panels

www.bio-rad.com/bio-plex

Available Human Cancer Biomarker Panel 1 Analytes

sEGFR	sIL-6R α	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 Human Cancer Biomarker Panel 2 Analytes

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
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Human Premixed All-in-One Kit

171AC500M	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-6R α , leptin, osteopontin, PDGF-AB/BB, PECAM-1, prolactin, SCF, sTIE-2, sVEGFR-1, sVEGFR-2
171AC600M	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
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Catalog #	Description
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Bio-Plex Pro Human Cancer Biomarker Panel 1 Singleplex Sets*, 1 x 96-Well (receptors, cytokines, chemokines, growth factors, and hormones)

171BC501M	sEGFR Set	171BC509M	Osteopontin Set
171BC502M	FGF-basic Set	171BC511M	PDGF-AB/BB
171BC503M	Follistatin Set	171BC510M	PECAM-1 Set
171BC504M	G-CSF Set	171BC512M	Prolactin Set
171BC505M	HGF Set	171BC513M	SCF Set
171BC506M	sHER-2 / neu Set	171BC514M	sTIE-2 Set
171BC507M	sIL-6Rα Set	171BC515M	sVEGFR-1 Set
171BC508M	Leptin Set	171BC516M	sVEGFR-2 Set

Standards

171DC5000	Bio-Plex Pro Human Cancer Biomarker Panel 1, 16-Plex Standards , pkg of 1 vial, lyophilized mixture of 16 standard analytes
171DC5001	Bio-Plex Pro Human Cancer Biomarker Panel 1, 16-Plex Standards , pkg of 50 lot-matched vials, lyophilized mixture of 16 standard analytes

Bio-Plex Pro Human Cancer Biomarker Panel 2 Singleplex Sets*, 1 x 96-Well (ligands, cytokines, chemokines, and growth factors)

171BC601M	Angiopoietin-2 Set	171BC611M	PAI-1 Set
171BC602M	sCD40L Set	171BC612M	PLGF Set
171BC603M	EGF Set	171BC613M	TGF-α Set
171BC604M	Endoglin	171BC614M	TNF-α Set
171BC605M	sFASL Set	171BC615M	uPA Set
171BC606M	HB-EGF Set	171BC616M	VEGF-A Set
171BC607M	IGFBP-1 Set	171BC617M	VEGF-C Set
171BC608M	IL-6 Set	171BC618M	VEGF-D Set
171BC609M	IL-8 Set		

Standards

171DC6000	Bio-Plex Pro Human Cancer Biomarker Panel 2, 18-Plex Standards , pkg of 1 vial, lyophilized mixture of 18 standard analytes
171DC6001	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 II — for use with human cancer biomarker panels 1 and 2

171304055M	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 separation methods
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* Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

Bio-Plex Pro™ Diabetes Assays

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, non-human primate, mouse, and rat diabetes-related biomarkers using as little as 12.5 µl of sample per well.

Key features include:

- **Increased productivity** — measure up to 10 diabetes and obesity markers, plus adiponectin and adipsin, in only 3 hours
- **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 or 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: 6342 and 6119

Available Bio-Plex Pro Diabetes Assays

Human (compatible with non-human primates)*	Mouse	Rat
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		

* See instruction manual for details.

Ordering Information

Catalog #	Description
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Human Premixed All-in-One Kits (compatible with non-human primate samples)

171A7001M	Bio-Plex Pro Human Diabetes 10-Plex Panel , 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, 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, and visfatin
171A7002M	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, flat bottom plate, sealing tape, serum-based diluent for the detection of adipsin and adiponectin
171A7003M	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, flat bottom plate, sealing tape, serum-based diluent for the detection of adiponectin
171A7004M	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, flat bottom plate, sealing tape, serum-based diluent for the detection of adipsin

Catalog #	Description
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Catalog #	Description
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Bio-Plex Pro Human Diabetes Singleplex Sets*, 1 x 96-Well

171B7003M	C-Peptide Set	171B7008M	Insulin Set
171B7004M	Ghrelin Set	171B7009M	Leptin Set
171B7005M	GIP Set	171B7010M	PAI-1 Set
171B7006M	GLP-1 Set	171B7011M	Resistin Set
171B7007M	Glucagon Set	171B7012M	Visfatin Set

Standards

171D70001	Bio-Plex Pro Human Diabetes Standards , pkg of 1 vial, lyophilized mixture of 12 analytes
171D70050	Bio-Plex Pro Human Diabetes Standards , pkg of 50 lot-matched vials, lyophilized mixture of 12 analytes

Mouse Premixed All-in-One Kits

171F7001M	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, and resistin
171F7002M	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

* Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards.
Singleplex sets should not be mixed with others from different panels or groups.

continues

Ordering Information

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Mouse Diabetes Singleplex Sets*, 1 x 96-Well			
171G7002M	Ghrelin Set	171G7006M	Insulin Set
171G7003M	GIP Set	171G7007M	Leptin Set
171G7004M	GLP-1 Set	171G7008M	PAI-1 Set
171G7005M	Glucagon Set	171G7009M	Resistin Set
Standards			
171I70001	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		
171I70050	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		
Bio-Plex Pro Rat Diabetes Singleplex Sets*, 1 x 96-Well			
171L7001M	Ghrelin Set	171L7006M	Leptin Set
171L7003M	GLP-1 Set	171L7007M	PAI-1 Set
171L7004M	Glucagon Set		
Standards			
171NZ0001	Bio-Plex Pro Rat Standards , pkg of 1 vial, lyophilized mixture of 31 standard analytes. Compatible with rat cytokine and rat diabetes assays		
171NZ0501	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 — for use with diabetes singleplex sets			
171304070M	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, for use with magnetic separation methods		

* Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

Bio-Plex Pro™ Human Isotyping Assays

Human Isotyping Assays

Bio-Plex Pro human isotyping 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 your research needs. They incorporate several features to enhance both quality and ease of use.

- **Magnetic beads** — simplified plate processing and improved reproducibility
- **Convenience** — all-in-one kit format for both multiplex and singleplex assays

Available Assays

IgG ₁	IgA
IgG ₂	IgM
IgG ₃	IgE
IgG ₄	IgG Total

- **1-level quality control**
- **Optimization** — one diluent optimized for use with samples, standards, and controls
- **Assay quick guide** — to get you started right away

For More Information

Web: www.bio-rad.com/isotyping
Request or download bulletin: 6344

Ordering Information

Catalog #	Description
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Bio-Plex Pro Human Isotyping Panel Premixed All-in-One Multiplex Kit

171A3100M	Bio-Plex Pro Human Isotyping Panel, 6-plex , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, 1-level quality controls, detection antibody diluent, isotyping diluent (for use with samples, standards, and controls), assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, assay quick guide, and product data sheet, for detection of IgG ₁ , IgG ₂ , IgG ₃ , IgG ₄ , IgA, and IgM
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Bio-Plex Pro Human Isotyping All-in-One Singleplex Kits*

171A3101M	IgA Kit , 1 x 96-well
171A3104M	IgM Kit , 1 x 96-well
171A3102M	IgE Kit , 1 x 96-well
171A3103M	IgG Total Kit , 1 x 96-well

* Singleplex kits are specific for each assay indicated and include coupled magnetic beads, detection antibodies, standards, 1-level quality controls, detection antibody diluent, isotyping diluent (for use with samples, standards, and controls), assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, assay quick guide, and product data sheet.

Bio-Plex Pro™ Human Acute Phase Assay Panel

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 assay features 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

Available Bio-Plex Pro Human Acute Phase Assays

α-2-macroglobulin	Procalcitonin
CRP	SAA
Ferritin	SAP
Fibrinogen	Tissue plasminogen activator
Haptoglobin	

- 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.

For More Information

Web: www.bio-rad.com/bio-plexproacutephase

Request or download bulletin: 5650

Ordering Information

Catalog #	Description
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Complete Kits*

171A4S07M	Bio-Plex Pro Human Acute Phase 5- + 4-Plex Panel Complete Kit , 1 x 96-well
171A4C09M	Bio-Plex Pro Human Acute Phase 4-Plex Panel Complete Kit , 1 x 96-well
171A4C07M	Bio-Plex Pro Human Acute Phase 5-Plex Panel Complete Kit , 1 x 96-well

* Singleplex kits are specific for each assay indicated and include coupled magnetic beads, detection antibodies, standards, 1-level quality controls, detection antibody diluent, isotyping diluent (for use with samples, standards, and controls), assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, assay quick guide, and product data sheet.

continues

Ordering Information

Catalog #	Description
Assay Kits*	
171A4007M	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 diluent kit
171A4008M	Bio-Plex Pro Human Acute Phase 5-Plex Panel , 10 x 96-well, requires 10 acute phase reagent kits and 10 acute phase diluent kits
171A4009M	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 diluent kit
171A4010M	Bio-Plex Pro Human Acute Phase 4-Plex Panel , 10 x 96-well, requires 10 acute phase reagent kits and 10 acute phase diluent kits
Standards	
171D40002	Bio-Plex Pro Human Acute Phase Standards , pkg of 2 vials, lyophilized mixture of 9 standard antigens
171D40006	Bio-Plex Pro Human Acute Phase Standards , pkg of 50 lot-matched vials, lyophilized mixture of 9 standard antigens
Reagent Kit	
171304050	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**	
171305050	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 reagent kit is required for use with each assay kit.

** One acute phase diluent kit is sufficient to perform one 5-plex and one 4-plex assay.

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 Luminex 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
MC100xx01*	Bio-Plex Pro Magnetic COOH Beads , 1 ml
MC100xx04*	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
1715060xx*	Bio-Plex Nonmagnetic COOH Beads , 1.25×10^7 beads/ml, 1 ml
1716060xx*	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 μ l 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	
171406001*	Bio-Plex Amine Coupling Kit , 30 reactions, includes bead wash buffer, bead activation buffer, storage buffer, staining buffer, coupling reaction tubes
Bio-Plex Streptavidin-PE**	
171304501	Bio-Plex Streptavidin-PE , streptavidin-phycoerythrin for 10 x 96-well reactions

* For protein coupling only.

**Streptavidin-PE is a component of all reagent kits and is available separately.

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Microplate Systems

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Microplate Absorbance Readers and Accessories

Instruments and Software

See Also

Protein assays:
page 30.

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
1681130	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
1681135	iMark Microplate Absorbance Reader with Microplate Manager 6 Software , for PC and MAC
Accessories	
1660495	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
1686940	Checkmark Reader Performance Verification Kit , includes absorbance calibration plate, Checkmark software
1682230	IQ/OQ Kit for iMark Microplate Absorbance Reader , includes #1686940, 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



Ordering Information

Catalog #	Description
1681150	xMark Microplate Absorbance Spectrophotometer , PC or Mac, built-in incubator, plate shaker, Microplate Manager 6 software, USB2 and power cables
1682000	Plate Adaptor , for using Terasaki plate with xMark microplate absorbance spectrophotometer

Accessories

1682250	IQ/OQ Kit for xMark Microplate Absorbance Spectrophotometer , includes #1686940, IQ/OQ protocols
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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
1689520	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
1707009	ImmunoWash 1575 Microplate Washer , 110–240 V, includes bottle and tubing set, 8-port manifold, aerosol protection cover
1707021	ImmunoWash 1575 12-Channel Manifold
1707026	ImmunoWash 1575 Standard Maintenance Kit

ELISA Reagents and Kits

See Also

Blotting-grade conjugates; page 254.

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	
1721011	Goat Anti-Mouse IgG (H + L)-HRP Conjugate, 2 ml
1721033	Goat Anti-Human IgG (γ)-HRP Conjugate, 1 ml
1721019	Goat Anti-Rabbit IgG (H + L)-HRP Conjugate, 1 ml
1721034	Rabbit Anti-Goat IgG (H + L)-HRP Conjugate, 1 ml
1721017	Rabbit Anti-Sheep IgG (H + L)-HRP Conjugate, 1 ml
1721037	Rabbit Anti-Goat IgG (H + L)-AP Conjugate, 1 ml
Substrate Systems	
1721063	AP Substrate Kit, contains 100 pNPP tablets and 100 ml 5x concentrate diethanolamine buffer
1721064	HRP Substrate Kit, contains 180 ml ABTS, 20 ml hydrogen peroxide
1721066	TMB Peroxidase EIA Substrate Kit, contains 180 ml TMB solution, 20 ml hydrogen peroxide
1721067	TMB Peroxidase EIA Substrate Kit, contains 900 ml TMB solution, 100 ml hydrogen peroxide
1721068	Single-Component TMB Peroxidase EIA Substrate Kit, contains 100 ml TMB solution
1721072	Single-Component TMB Peroxidase ELISA Substrate Kit, contains 1 L TMB solution

Enzyme-Antibody Conjugates

Substrate Systems

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

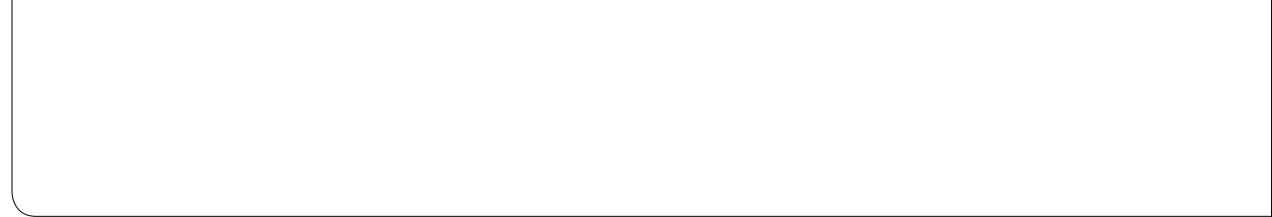
Web: www.bio-rad.com/microplatereagents

Ordering Information

Catalog #	Description
1722051	Mouse Typer Isotyping Kit, includes mouse isotyping panel, affinity purified goat anti-rabbit IgG (H + L)
1722055	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

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Transfection

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<u>Lipid Transfection Reagents</u>	<u>347</u>
<u>Electroporation Systems and Reagents</u>	<u>348</u>
<u>Biolistic Particle Delivery Systems</u>	<u>354</u>

Transfection Technologies

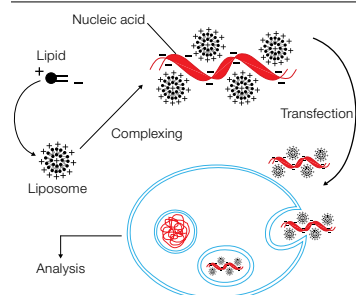
Introducing DNA and RNA into cells is a powerful tool for evaluating gene expression. Bio-Rad's transfection products offer choices for gene delivery to bacterial, fungal, plant, and animal cells. Use the guide below to select the most appropriate transfection technology for your application.

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

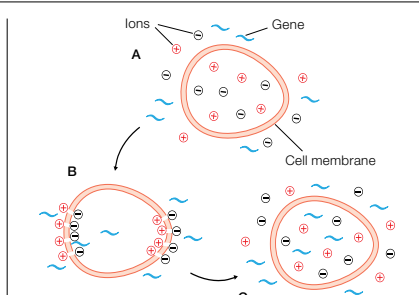
Transfection Technologies	Page	Plants										Bacteria	Fungi	Animals									
		Plant Cell Suspension Cultures	Plant Cell Adherent Cultures	Plant Cell Callus or Explants	Pollen	Leaves (in situ)	Detached Leaves	Meristems (in situ)	Detached Meristems	Gram-Positive Bacteria	Gram-Negative Bacteria	Yeast	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	347												○	○	●	●	●	●	●				
TransFectin™ lipid reagent	348												○	○	●	●	●	●	●				
Electroporation																							
Gene Pulser Xcell™ total system	350	●*		●*			○		○	●	●	●	●			●	●	●	●				
Gene Pulser Xcell eukaryotic system	350	●*		●*		○		○	○	○	○	○			●	●	●	●					
Gene Pulser Xcell microbial system	350							●	●	●	●												
MicroPulser™ electroporator	352							●	●	●	●												
Biolytic Particle Delivery																							
Helios® gene gun system	355	●	●	●	●	●	●	○	○	●	●	●	○	○	●	●		●	●	●			
PDS-1000/He™ system	356	●	●	●	●		●	●	○	○	●	●		●	○	●		●	●	●			
PDS-1000/He system with Hepta™ adaptor	356	●	●	●	●		●	●	○	○	●	●		●	○	●		●	●	●			

- First choice, highly recommended.
- Recommended, but other technologies may be better suited to that application.
- o Possible, but little data to support its effectiveness.
- * Protoplasts required.

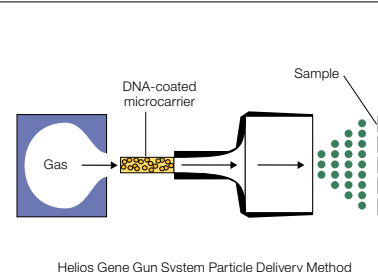
Lipid Transfection
page 347



Electroporation
page 348



Biolytic Particle Delivery
page 354



Lipid Transfection Reagents

Lipid transfection is the process of using lipids to enable 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 348 (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/silentfect

Request or download bulletins: 3105, 5439, and 5894



See Also

TC20 automated cell counter; page 40.

Experion automated electrophoresis system; page 279.

Supermixes for PCR and real-time PCR; page 383.

Real-time PCR systems; page 371.

Ordering Information

Catalog #	Description
1703360	siLentFect Lipid Reagent for RNAi, 0.5 ml
1703361	siLentFect Lipid Reagent for RNAi, 1.0 ml
1703362	siLentFect Lipid Reagent for RNAi, 5 x 1.0 ml

See Also

Real-time qPCR
supermixes:
page 383.

Real-time PCR
systems:
page 371.

Total RNA
extraction kits:
page 17.

Plasmid purification
kits: page 13.

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 and 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

For More Information

Web: www.bio-rad.com/transfectin

Request or download bulletins: 2873 and 3197

Ordering Information

Catalog #	Description
1703350	TransFectin Lipid Reagent, 0.5 ml
1703351	TransFectin Lipid Reagent, 1.0 ml
1703352	TransFectin Lipid Reagent, 5 x 1.0 ml

Electroporation Systems and Reagents

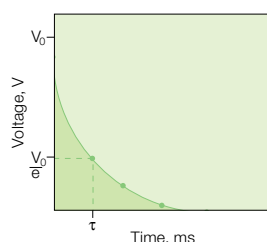
Electroporation is a powerful, highly efficient technique for introducing molecules (nucleic acids, proteins, carbohydrates, dyes) and viral particles into a wide variety of prokaryotic and eukaryotic cells. A high-intensity electric field transiently permeabilizes the membrane, enabling uptake of molecules from the surrounding

medium. Electroporation provides a valuable and effective alternative to chemical, biological, and other physical methods of transfection.

For More Information

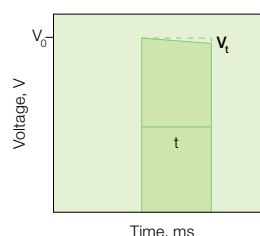
Web: www.bio-rad.com/electroporation

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

The Gene Pulser Xcell™ electroporation system generates 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 the Gene Pulser® system.

Electroporation Systems Selection Guide



Gene Pulser Xcell System
page 350



MicroPulser™ System
page 352

Plate-based system	No	No
Cuvette-based system	Yes	Yes
Eukaryotic or prokaryotic	Both	Prokaryotic
Recommended cells	Mammalian, bacterial, and fungal cell lines	Bacterial, yeast, and other microorganisms
Chamber	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 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
1652676	Gene Pulser Electroporation Buffer, 10 x 1.8 ml
1652677	Gene Pulser Electroporation Buffer, 30 ml

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) or 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
1652660	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
1652661	Gene Pulser Xcell Eukaryotic System , 100/240 V, 50/60 Hz, exponential-decay (25–3,275 μ F range) and square-wave delivery, includes main unit, CE module, ShockPod cuvette chamber, 5 sterile cuvettes (0.4 cm gap), cuvette rack
1652662	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

1652666	Gene Pulser Xcell Main Unit , 100/240 V, 50/60 Hz
1652667	Gene Pulser Xcell CE Module , 25–3,275 μ F range controlled by main unit, includes integral leads
1652668	Gene Pulser Xcell PC Module , 50–1,000 Ω range controlled by main unit, includes integral leads
1652669	Gene Pulser Xcell ShockPod Cuvette Chamber , includes integral leads for connection to Gene Pulser Xcell, Gene Pulser II, or MicroPulser electroporators
1652095	Gene Pulser Cuvette Rack

Gene Pulser MXcell™ Electroporation Plates

Electroporation Plates

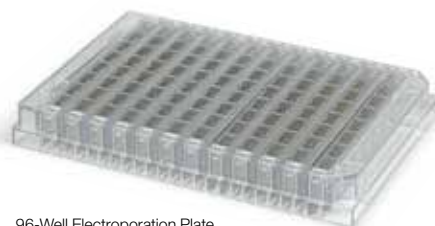
Electroporation plates for use with the Gene Pulser MXcell electroporation system are available in three formats: 96-well for low-volume or screening experiments, and 24- or 12-well.

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

For More Information

Web: www.bio-rad.com/mxcellplates



96-Well Electroporation Plate

Ordering Information

Catalog #	Description
Electroporation Plates	
1652681	96-Well Electroporation Plate
1652682	24-Well Electroporation Plate
1652683	12-Well Electroporation Plate

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
1652100	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 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	
1652088	Gene Pulser/MicroPulser Cuvettes, 0.4 cm gap, 50
1652086	Gene Pulser/MicroPulser Cuvettes, 0.2 cm gap, 50
1652089	Gene Pulser/MicroPulser Cuvettes, 0.1 cm gap, 50
Jumbo Packs*	
1652091	Gene Pulser/MicroPulser Cuvettes, 0.4 cm gap, 500
1652092	Gene Pulser/MicroPulser Cuvettes, 0.2 cm gap, 500
1652093	Gene Pulser/MicroPulser Cuvettes, 0.1 cm gap, 500
Mini Packs	
1652081	Gene Pulser/MicroPulser Cuvettes, 0.4 cm gap, 5
1652082	Gene Pulser/MicroPulser Cuvettes, 0.2 cm gap, 5
1652083	Gene Pulser/MicroPulser Cuvettes, 0.1 cm gap, 5

* Please inquire about volume pricing.

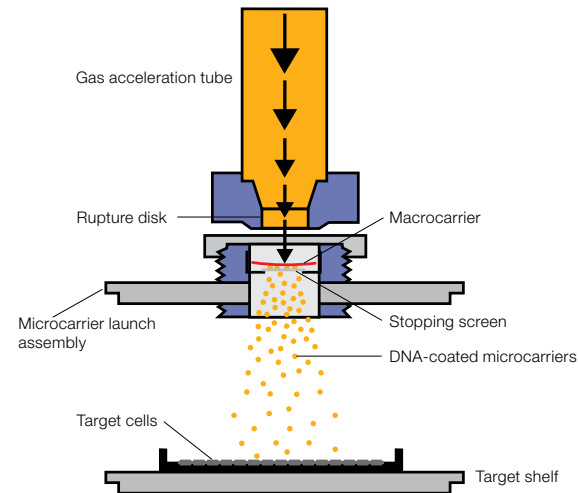
Biolistic Particle Delivery Systems

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 cm²)	Large (40 cm²)	Largest (~75 cm²)
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, CaCl₂, 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
1652431*	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
1652432	Helios Gene Gun System, 220/240 V
1652451	Helios Gene Gun Low-Pressure System, 100/120 V , same as #1652431 with low-pressure regulator (maximum 400 psi)
1652452	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 (#1652425 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 for later use at 4°C in cartridge collection/storage vials with a desiccant pellet. Additional barrel liners, cartridge holders, and other accessories are also available.

Ordering Information

Catalog #	Description
1652244	GeneShot Control Cartridges , positive control bullets, 12
1652412	Helium Hose Assembly , with Swagelok quick-connect fittings
1652413	Helium Regulator , CGA 580 female fitting (U.S. standard), with pressure relief valve; maximum pressure 2,600 psi
1652414	Low-Pressure Helium Regulator for Helios Gene Gun , maximum pressure 400 psi
1652418	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
1652420	Tubing Prep Station , 220/240 V
1652421	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
1652422	Tubing Cutter , includes tubing cutter unit, 10 razor blades
1652424	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
1652440	Cartridge Kit , contains 0.5 g PVP (MW 360,000), 5 cartridge collection/storage vials, 5 desiccant pellets, 50' Tefzel tubing
1652262	0.6 μm Gold Microcarriers , 0.25 g
1652263	1.0 μm Gold Microcarriers , 0.25 g
1652264	1.6 μm Gold Microcarriers , 0.25 g
1652425	Nitrogen Regulator for U.S. Standard Connections
1652416	O-Rings , 5
1652417	Barrel Liner , 5
1652426	Cartridge Holder , white, 5
1652435	Cartridge Extractor Tool , for removal of discharged cartridge
1652436	Battery , 9 V
1652441	Tefzel Tubing , 15 m (50')
1652475	Helios Diffusion Screens , 5
1652411	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 control 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
1652257*	PDS-1000/He System , includes helium pressure regulator, solenoid, spacer rods, microcarrier launch assembly, target shelf, 5 macrocarrier holders, tubing
1652258*	PDS-1000/He Hepta System , includes PDS-1000/He system, Hepta adaptor
1652225	Hepta Adaptor for PDS-1000/He System , includes 5 stopping screens
1652259	Voltage Converter , for 220/240 V line voltage

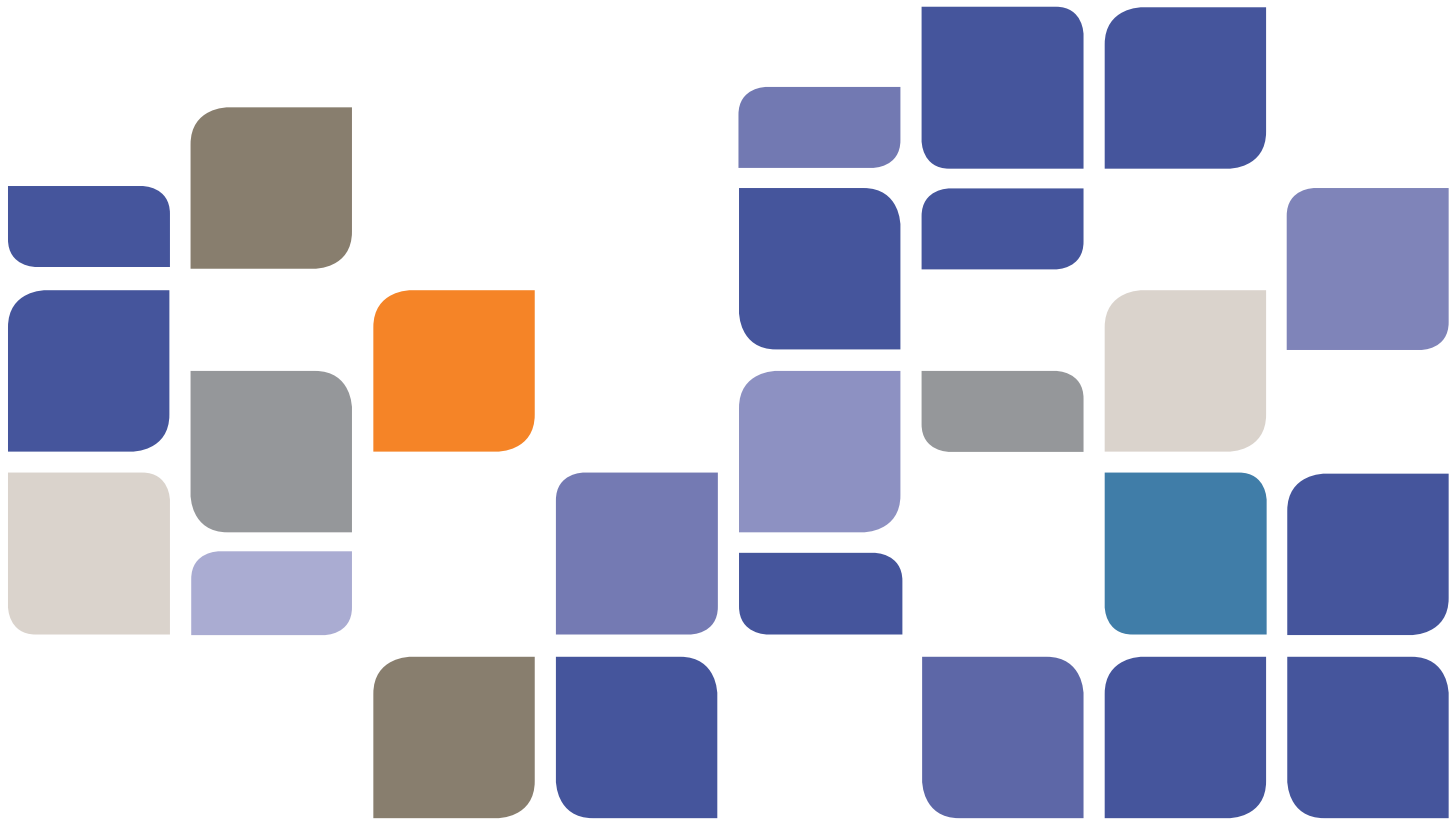
Accessories

1652278	500 Optimization Kit , includes 0.25 g each of 0.6, 1.0, and 1.6 μm gold microcarriers, 100 each of 9 rupture disks, 500 macrocarriers, 500 stopping screens
1652335	Macrocarriers , 500
1652322	Macrocarrier Holders , 5
1652326	450 psi Rupture Disks , 100
1652327	650 psi Rupture Disks , 100
1652328	900 psi Rupture Disks , 100
1652329	1,100 psi Rupture Disks , 100
1652330	1,350 psi Rupture Disks , 100
1652331	1,550 psi Rupture Disks , 100
1652332	1,800 psi Rupture Disks , 100
1652333	2,000 psi Rupture Disks , 100
1652334	2,200 psi Rupture Disks , 100
1652336	Stopping Screens , 500
1652226	Hepta Stopping Screens , 50
1652262	0.6 μm Gold Microcarriers , 0.25 g
1652263	1.0 μm Gold Microcarriers , 0.25 g
1652264	1.6 μm Gold Microcarriers , 0.25 g
1652266	Tungsten M-10 Microcarriers , $\sim 0.7 \mu\text{m}$, 6 g
1652267	Tungsten M-17 Microcarriers , $\sim 1.1 \mu\text{m}$, 6 g
1652268	Tungsten M-20 Microcarriers , $\sim 1.3 \mu\text{m}$, 6 g
1652269	Tungsten M-25 Microcarriers , $\sim 1.7 \mu\text{m}$, 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.

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DNA Amplification/PCR

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Digital PCR

Droplet Digital™ PCR Instrument

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 QX200™ AutoDG™ Droplet Digital™ PCR and QX200 Droplet Digital PCR systems, combined with our ddPCR supermixes, ddPCR assays and kits, and reliable thermal cyclers, offer researchers an easy-to-use, highly precise, and reproducible digital PCR package.

 [Learn More about the Technology](#)
Web: www.bio-rad.com/tech/ddPCR

See Also

C1000 Touch
thermal cycler:
page 368.

PX1 PCR
plate sealer:
page 396.

QX200™ Droplet Digital™ PCR System

The QX200 Droplet Digital PCR (ddPCR™) system provides an absolute quantification of target DNA or RNA molecules with unmatched precision and sensitivity for digital PCR applications.

Benefits

- Most precise and sensitive digital PCR solution for a wide variety of applications
- Flexible digital PCR chemistry — optimized for TaqMan hydrolysis probes and EvaGreen dye assays
- Flexible assay setup — scalable for high sensitivity or high throughput
- Simple and easy-to-use workflow with 96-sample throughput
- Droplet partitioning by the QX200 Droplet Digital technology reduces bias from amplification efficiency and PCR inhibitors
- Convenient assay design — standard curves are not required

Applications

- **Cancer biomarker studies** — superior sensitivity and resolution for measuring varying degrees of mutagenesis for detection of rare DNA target copies, copy number variation states, and allelic discrimination
- **Pathogen detection** — extremely high precision while measuring circulating DNA from biological samples (proven for HIV studies)
- **Gene expression analysis** — reliably measure low levels of mRNA and miRNA without using a standard curve
- **Next-generation sequencing** — quantify NGS library preparations without the use of standard curves; validate NGS results

- **Environmental** — popular for quality testing in a wide variety of environmental samples such as soil and water
- **Food testing** — validated method for routine evaluation of genetically modified organisms (GMO)

Workflow

The QX200 droplet generator partitions samples containing genomic DNA, cDNA, or RNA template into ~20,000 nanoliter-sized droplets (8 samples/run). After PCR using a Bio-Rad thermal cycler, droplets from each sample are streamed in single file through the QX200 droplet reader. The PCR-positive and PCR-negative droplets are counted to provide absolute quantification of target DNA in digital form (96 samples/run).

Accessories

Droplet generation and reader oils, ddPCR reagents, droplet generator cartridges, and gaskets are used with the system.

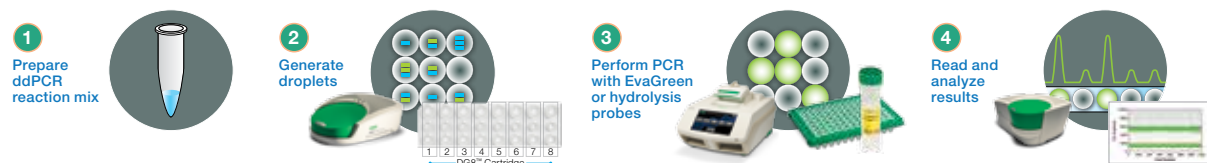
NEW Automated Droplet Generator

Automated droplet generator allows hands-free droplet generation for up to 96 samples quickly and reproducibly.

- Provides a high-throughput solution for digital PCR with the QX200 ddPCR system
- Minimizes setup time for a 96-sample plate
- Requires no hands-on activity during droplet generation
- Eliminates user-to-user variability
- Reduces contamination risk during droplet generation

For More Information

Web: www.bio-rad.com/digitalpcr



Ordering Information

Catalog #	Description
QX200 Droplet Digital PCR System	
1864001	QX200 Droplet Digital PCR system , includes droplet generator, droplet reader, laptop computer, software, associated component consumables
1864100	QX200 AutoDG Droplet Digital PCR System , includes automated droplet generator, droplet reader, laptop computer
1864002	QX200 Droplet Generator , includes droplet generator, 1 box of 24 cartridges, 1 pkg of 24 gaskets, 2 cartridge holders, 1 power cord
1864101	Automated Droplet Generator , includes automated droplet generator, 1 power cord
1864003	QX200 Droplet Reader , includes droplet reader, 2 plate holders, 1 USB cable, 1 power cord
Consumables and Accessories for both QX100 and QX200 ddPCR Systems	
1863004	ddPCR Droplet Reader Oil , 2 x 1 L bottles
1863005	Droplet Generation Oil for Probes , 10 x 7 ml bottles
1864008	DG8 Cartridges for QX100/QX200 Droplet Generator , 1 pkg of 24 cartridges
1863009	DG8 Gaskets for QX100/QX200 Droplet Generator , 1 pkg of 24 gaskets
1864007	Droplet Generator Cartridges and Gaskets , 5 pkg of 24 DG8 cartridges, 5 pkg of 24 DG8 gaskets
1863051	DG8 Cartridge Holder
Consumables and Accessories for QX200 ddPCR System Only	
1864005	Droplet Generation Oil for EvaGreen , 2 x 7 ml bottles
1864006	Droplet Generation Oil for EvaGreen , 10 x 7 ml bottles
Consumables and Accessories for Automated Droplet Generator Only	
1864108	DG32 Automated Droplet Generator Cartridges , 1 pkg of 30, enough for 10 x 96-well ddPCR plates
1864109	DG32 Automated Droplet Generator Cartridges , 1 pkg of 60, enough for 20 x 96-well ddPCR plates
1864110	Automated Droplet Generation Oil for Probes , 140 ml, enough for 20 x 96-well ddPCR plates
1864112	Automated Droplet Generation Oil for EvaGreen , 140 ml, enough for 20 x 96-well ddPCR plates
1864120	Pipet Tips for AutoDG System , 1 pkg of 20, enough for 10 x 96-well ddPCR plates
1864121	Pipet Tips for AutoDG System , 1 pkg of 40, enough for 20 x 96-well ddPCR plates
1864125	Pipet Tip Waste Bins for AutoDG System , 1 pkg of 10, enough for 10 x 96-well ddPCR plates

Droplet Digital™ PCR System Reagents

Bio-Rad offers PCR reagents for exclusive use with the ddPCR™ system. These reagents include supermixes for probe-based target detection, supermix for double-stranded DNA detection, NGS library quantification kits, and PrimePCR™ assays for ddPCR.

ddPCR Supermix Selection Guide

Application	ddPCR Supermix for Probes	ddPCR Supermix for Probes (no dUTP)	QX200 ddPCR EvaGreen Supermix	ddPCR Supermix for Residual DNA Quantification	One-Step RT-ddPCR Kit for Probes
Suitable for UNG decontamination protocols	•		•	•	•
PrimePCR ddPCR Mutation Detection Assays		•			
PrimePCR ddPCR Copy Number Assays		•			
PrimePCR Gene Expression Assays			•		
ddPCR Library Quantification Kit for Illumina TruSeq		•			
ddPCR Library Quantification Kit for Ion Torrent		•			
Double-stranded DNA detection			•		
Residual host cell DNA detection				•	
Absolute quantification of target RNA molecules					•

ddPCR, Droplet Digital PCR; dUTP, 2'-deoxyuridine 5'-triphosphate; UNG, uracil N-glycosylase.

See Also

C1000 Touch
thermal cycler:
page 366.
PX1 PCR
plate sealer:
page 396.

Coming Soon ddPCR™ Supermix for Residual DNA Quantification

ddPCR™ supermix for residual DNA quantification is a ready-to-use 2x cocktail containing all components, except primers, probe(s), and template, required for probe-based detection of residual *Escherichia coli*, Chinese hamster ovary (CHO), mouse, or yeast DNA.

Key features:

- Enables direct quantification of residual host cell DNA without the need for DNA extraction
- Allows for femtogram-level sensitivity and precision

For More Information

Web: www.bio-rad.com/digitalpcr



Ordering Information

Catalog #	Description
1864037	ddPCR Supermix for Residual DNA Quantification , 2 x 1 ml vials, 2x supermix, for use in residual DNA sample detection with the QX100 or QX200 droplet generator
1864038	ddPCR Supermix for Residual DNA Quantification , 5 x 1 ml vials, 2x supermix, for use in residual DNA sample detection with the QX100 or QX200 droplet generator
1864039	ddPCR Supermix for Residual DNA Quantification , 5 x 5 ml vials, 2x supermix, for use in residual DNA sample detection with the QX100 or QX200 droplet generator
1864040	ddPCR Supermix for Residual DNA Quantification , 10 x 5 ml vials, 2x supermix, for use in residual DNA sample detection with the QX100 or QX200 droplet generator

ddPCR™ Supermix for Probes

ddPCR supermix for probes is a ready-to-use 2x supermix used to partition and amplify DNA for digital PCR. It is suitable for use with UNG decontamination protocols, which prevent the reamplification of carryover PCR products between experiments.

- Ensures precise target quantification
- Uses standard cycling protocols for probe-based simplex or duplex ddPCR
- Enables partitioning of sample into droplets to eliminate performance variations



For More Information

Web: www.bio-rad.com/digitalpcr
Request or download bulletin: 6338

Ordering Information

Catalog #	Description
1863026	ddPCR Supermix for Probes , 2 x 1 ml vials, 2x supermix, for use in sample preparation for QX100 or QX200 droplet generator
1863010	ddPCR Supermix for Probes , 5 x 1 ml vials, 2x supermix, for use in sample preparation for QX100 or QX200 droplet generator
1863027	ddPCR Supermix for Probes , 5 x 5 ml vials, 2x supermix, for use in sample preparation for QX100 or QX200 droplet generator
1863028	ddPCR Supermix for Probes , 10 x 5 ml vials, 2x supermix, for use in sample preparation for QX100 or QX200 droplet generator

ddPCR™ Supermix for Probes (no dUTP)

ddPCR supermix for probes (no dUTP) is a ready-to-use cocktail 2x supermix containing all components except primers and template. It is used for DNA sample preparation for applications such as NGS library preparation and PCR cloning.

- Limits nonspecific PCR amplification
- Allows for DNA recovery after amplification

For More Information

Web: www.bio-rad.com/digitalpcr

Request or download bulletin: 6338

**Ordering Information**

Catalog #	Description
1863023	ddPCR Supermix for Probes (no dUTP) , 2 x 1 ml vials, 2x supermix, for use in nucleic acid sample preparation with the QX100 or QX200 droplet generator
1863024	ddPCR Supermix for Probes (no dUTP) , 5 x 1 ml vials, 2x supermix, for use in nucleic acid sample preparation with the QX100 or QX200 droplet generator
1863025	ddPCR Supermix for Probes (no dUTP) , 5 x 5 ml vials, 2x supermix, for use in nucleic acid sample preparation with the QX100 or QX200 droplet generator

One-Step RT-ddPCR Kit for Probes

One-step RT-ddPCR kit for probes is a ready-to-use 2x supermix used to partition and amplify DNA for digital PCR. It contains thermostable enzymes that allow for RNA template to be reverse transcribed and subsequently amplified in the same reaction tube.

- Enhances the specificity and efficiency of primer-mediated cDNA conversion by performing the reverse transcription reaction at 55–60°C
- Contains RNase inhibitor that protects the RNA throughout the workflow

For More Information

Web: www.bio-rad.com/digitalpcr

Request or download bulletin: 6250

**Ordering Information**

Catalog #	Description
1863021	One-Step RT-ddPCR Kit for Probes , 2 x 1 ml, 200 x 20 µl reactions, 2x RT-ddPCR mix
1863022	One-Step RT-ddPCR Kit for Probes , 5 x 1 ml, 500 x 20 µl reactions, 2x RT-ddPCR mix

QX200™ ddPCR™ EvaGreen® Supermix

The QX200 ddPCR EvaGreen supermix is a ready-to-use 2x supermix containing a dsDNA binding dye used to partition and amplify DNA for digital PCR. It is the only dye chemistry optimized for digital PCR.

- Enables double-stranded DNA detection following PCR amplification

- Allows for the amplification and detection of DNA targets using commercially available EvaGreen assays

For More Information

Web: www.bio-rad.com/digitalpcr
Request or download bulletin: 6473



Ordering Information

Catalog #	Description
1864033	QX200 ddPCR EvaGreen Supermix , 2 x 1 ml vials, for use in nucleic acid sample preparation with the QX200 droplet generator
1864034	QX200 ddPCR EvaGreen Supermix , 5 x 1 ml vials, for use in nucleic acid sample preparation with the QX200 droplet generator
1864035	QX200 ddPCR EvaGreen Supermix , 5 x 5 ml vials, for use in nucleic acid sample preparation with the QX200 droplet generator
1864036	QX200 ddPCR EvaGreen Supermix , 10 x 5 ml vials, for use in nucleic acid sample preparation with the QX200 droplet generator

ddPCR™ Library Quantification Kits

ddPCR Library Quantification Kit for Illumina TruSeq

The QX200™ ddPCR™ system is the optimal solution for preparation and quantification of NGS libraries. The kit allows for accurate quantification and qualitative measures of the DNA library prior to sequencing on Illumina platforms.

- Contains all the necessary components to create droplets and quantify the NGS libraries (ddPCR supermix for probes (no dUTP) and ddPCR library quantification assay)
- Provides information about library quality, such as adapter dimers, and a sense of library insert size
- Provides more efficient and consistent loading of libraries for sequencing runs
- Enables balancing of pooled library samples
- Optimizes 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 bulletin: 6402

ddPCR Library Quantification Kit for Ion Torrent

The QX200 ddPCR system is the optimal solution for preparation and quantification of NGS libraries. The kit allows for accurate quantification and qualitative measures of the DNA library prior to sequencing with Ion Torrent platforms.

- Contains all the necessary components to create droplets and quantify Ion AmpliSeq genomic DNA and Ion RNA-Seq libraries
- Provides absolute library quantification leading to improved sequencing efficiency

For More Information

Web: www.bio-rad.com/digitalpcr
Request or download bulletin: 6490



Ordering Information

Catalog #	Description
1863040	ddPCR Library Quantification Kit for Illumina TruSeq , includes 1 vial of primers and probes at 20x concentration, 2x ddPCR supermix for probes (no dUTP)
1863041	ddPCR Library Quantification Kit for Ion Torrent , includes 1 vial of primers and probes at 20x concentration, 2x ddPCR supermix for probes (no dUTP)

PrimePCR™ ddPCR™ Assays

PrimePCR probe assays for the Droplet Digital™ PCR system allow detection of small fold changes without a standard curve. PrimePCR ddPCR assays are predesigned, fully wet-lab validated assays. They are available in two formats:

Mutation Detection Assays

- Predesigned mutation detection probe assays are available in 200, 1,000, and 2,500 reaction sizes
- 1:2,000 detection of mutant:wild type in a single well
- Works on both QX100™ and QX200™ ddPCR™ platforms
- Uniform cycling conditions and primer/probe strategy
- Biologically relevant targets (for example, COSMIC v57)

Copy Number Assays

- Predesigned copy number probe assays are available in 200, 1,000 and 2,500 reaction sizes
- Universal/single restriction enzyme strategy used for assay design
- Works on both QX100 and QX200 ddPCR platforms
- Uniform cycling conditions and primer/probe strategy
- Primer specificity confirmed by next-generation sequencing

For More Information

Web: www.bio-rad.com/digitalpcr
Request or download bulletin: 6512

Ordering Information

To place an order, visit www.bio-rad.com/PrimePCR.

New ddPCR *SMN1* Copy Number Determination Kit

The ddPCR *SMN1* copy number determination kit can be used for copy number determination of the survival motor neuron 1 (*SMN1*) gene. It contains a duplex assay, ddPCR™ supermix for probes (no dUTP) and positive controls for 0, 1, and 2 copies of *SMN1*.

- Predesigned and wet-lab validated copy number assay
- Uniform cycling conditions
- Contains all the necessary components to create droplets and determine copy number of the *SMN1* target

For More Information

Web: www.bio-rad.com/digitalpcr
Request or download bulletin: 6630

**Ordering Information**

Catalog #	Description
1863500	ddPCR <i>SMN1</i> Copy Number Determination Kit , includes assay at 20x concentration, 2x ddPCR supermix for probes (no dUTP), and positive controls

New ddPCR *SMN2* Copy Number Determination Kit

The ddPCR *SMN2* copy number determination kit can be used for copy number determination of the survival motor neuron 2 (*SMN2*) gene. It contains a duplex assay, ddPCR supermix for probes (no dUTP) and positive controls for 2, 3, and 4 copies of *SMN2*.

- Predesigned and wet-lab validated copy number assay
- Uniform cycling conditions
- Contains all the necessary components to create droplets and determine copy number of the *SMN2* target



For More Information

Web: www.bio-rad.com/digitalpcr

Request or download bulletin: 6631

Ordering Information

Catalog #	Description
1863503	ddPCR <i>SMN2</i> Copy Number Determination Kit , includes assay at 20x concentration, 2x ddPCR supermix for probes (no dUTP), and positive controls

New ddPCR *KRAS* Screening Multiplex Kit

The ddPCR *KRAS* screening multiplex screening kit can be used for screening for *KRAS* mutations: *G12A*, *G12C*, *G12D*, *G12R*, *G12S*, *G12V*, and *G13D*. It contains a multiplex assay and ddPCR supermix for probes (no dUTP).

- Predesigned and wet-lab validated mutation detection assay
- Uniform cycling conditions
- Contains all the necessary components to create droplets and determine if a *KRAS* mutation is present



For More Information

Web: www.bio-rad.com/digitalpcr

Request or download bulletin: 6632

Ordering Information

Catalog #	Description
1863506	ddPCR <i>KRAS</i> Screening Multiplex Kit , includes 20x multiplex assay and 2x ddPCR supermix for probes (no dUTP)

Thermal Cyclers for PCR

Instruments range from a personal thermal cycler 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](http://www.bio-rad.com/tech/PCR)

Thermal Cycler Selection Guide

Feature	S1000™ page 367	C1000 Touch™ page 368	T100™ page 370
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
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
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](http://www.bio-rad.com/S1000)
Request or download bulletins: 6082 and 6094

Thermal Cyclers for PCR

1000-Series Thermal Cyclers

www.bio-rad.com/1000_series

Ordering Information

Catalog #	Description
1842000	S1000 Thermal Cycler Chassis , includes power cord; does not include reaction module
1852148	S1000 Thermal Cycler with Dual 48/48 Fast Reaction Module , includes S1000 thermal cycler chassis, dual 48/48 fast reaction module
1852196	S1000 Thermal Cycler with 96-Well Fast Reaction Module , includes S1000 thermal cycler chassis, 96-well fast reaction module
1852197	S1000 Thermal Cycler with 96-Deep Well Reaction Module , includes S1000 thermal cycler chassis, 96-deep well reaction module
1852138	S1000 Thermal Cycler with 384-Well Reaction Module , includes S1000 thermal cycler chassis, 384-well reaction module

Accessories

1848000	USB Cable , for use with C1000, C1000 Touch, and S1000 thermal cyclers
1849000	Tube Frame , supports individual 0.2 ml tubes in the C1000, C1000 Touch, and S1000 dual 48- and 96-well reaction modules
1849001	Tube Frame , supports individual 0.2 ml tubes in the C1000 Touch and S1000 96-deep well reaction module
1849010	Touch-Screen Protector , for use with C1000 Touch thermal cycler, 2
1841001	1000-Series Connectivity Kit , includes mouse, mouse pad, USB key

See Also

CFX96 Touch
real-time PCR
detection system:
page 373.

CFX384 Touch
real-time PCR
detection system:
page 375.

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™, CFX96 Touch™ Deep Well, 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 bulletins: 6085 and 6094

Ordering Information

Catalog #	Description
1841100	C1000 Touch Thermal Cycler Chassis , includes USB flash drive, power cord; does not include reaction module
1851148	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
1851196	C1000 Touch Thermal Cycler with 96-Well Fast Reaction Module , includes C1000 Touch thermal cycler chassis, 96-well fast reaction module, USB flash drive
1851197	C1000 Touch Thermal Cycler with 96-Deep Well Reaction Module , includes C1000 Touch thermal cycler chassis, 96-deep well reaction module, USB flash drive
1851138	C1000 Touch Thermal Cycler with 384-Well Reaction Module , includes C1000 Touch thermal cycler chassis, 384-well reaction module, USB flash drive

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
1840148	Dual 48/48 Fast Reaction Module , independent dual 48-well reaction module, fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled
1840196	96-Well Fast Reaction Module , fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled
1840197	96-Deep Well Reaction Module , fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled
1840138	384-Well Reaction Module , fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled

Personal Thermal Cycler

See Also

PCR plastic consumables:
page 397.

PCR reagents:
page 381.

Nucleic acid sample preparation:
page 21.

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

Ordering Information

Catalog #	Description
1861096	T100 Thermal Cycler , includes 96-well thermal cycler, power cord, tube support ring
1862000	Tube Support Ring , extra tube support ring for use with individual tubes in the T100 thermal cycler, 2
1863000	Touch-Screen Protector , for use with T100 thermal cycler, 2

Recommended Consumables

1708890	iScript cDNA Synthesis Kit , 25 x 20 µl reactions, includes 5x iScript reaction mix, iScript reverse transcriptase, nuclease-free water
1708896	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
1708870	iTaq DNA Polymerase , 250 U (5 U/µl), includes 10x PCR buffer, 50 mM MgCl ₂ solution
1725301	iProof High-Fidelity DNA Polymerase , 100 U (2 U/µl), includes 5x HF buffer, 5x GC buffer, 50 mM MgCl ₂ solution, DMSO
HSS9601	Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plates , clear shell, clear well, 25
MLP9601	Multiplate High-Profile 96-Well Unskirted PCR Plates , clear, 25
MSB1001	Microseal 'B' Adhesive Seals , optically clear, 100
TBS1201	0.2 ml 12-Tube Strips without Caps , clear, 100
TCS1201	Domed 12-Cap Strips , for 0.2 ml PCR tubes and plates, clear, 200
TWI0201	0.2 ml PCR Tubes with Domed Caps , clear, 1,000

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 up to five-target sequence detection via fluorescence detection chemistry in a 96- or 384-well plate format.

All systems support integrated data analysis for PrimePCR™ disease and biological pathway panels as well as automated multiplate gene expression analysis, absolute quantification, copy number variation, and high resolution melt genotyping applications. See the selection guide below for comparative specifications.

 [Learn More about the Technology](https://www.bio-rad.com/tech/qpcr)
Web: www.bio-rad.com/tech/qpcr

See Also

RNA extraction kits:
page 17.

Experion system:
page 279.

PCR reagents:
page 381.

PrimePCR assays
and panels:
page 380.

PX1 PCR plate sealer:
page 396.

PCR plastic
consumables:
page 397.

Real-Time PCR System Selection Guide



Feature	CFX Connect™	CFX96 Touch™	CFX96 Touch™ Deep Well	CFX384 Touch™
Base thermal cycler	CFX Connect	C1000 Touch	C1000 Touch	C1000 Touch
Sample capacity	96 wells	96 wells	96 wells	384 wells
Sample volume	Up to 50 µl	Up to 50 µl	Up to 125 µl	Up to 30 µl
Light source	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	3 photodiodes in optics shuttle	6 photodiodes in optics shuttle	6 photodiodes in optics shuttle	5 photodiodes in optics shuttle
Excitation range	450–535 nm	450–684 nm	450–684 nm	450–650 nm
Detection range*	515–580 nm	515–730 nm	515–730 nm	515–690 nm
Multiplex capability	Up to 2 targets	Up to 5 targets	Up to 5 targets	Up to 4 targets
FRET capability	•	•	•	•
Maximum ramp rate	5°C/sec	5°C/sec	2.5°C/sec	2.5°C/sec
Gradient capability	•	•	•	•
Gradient range	30–100°C	30–100°C	30–100°C	30–100°C
Maximum gradient span	24°C	24°C	24°C	24°C
CFX qualification plate	•	•	•	•

* Refer to system instruction manuals or bulletins 6093, 6096, and 6105 for information about useful detection ranges for specific dyes.

CFX Connect™ Real-Time PCR Detection System

The CFX Connect real-time PCR detection system offers two-target analysis 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.

- 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

For More Information

Web: www.bio-rad.com/cfxconnect

Request or download bulletins: 6102, 6103, and 6105



Ordering Information

Catalog #	Description
1855200	CFX Connect Real-Time PCR Detection System , includes CFX Connect thermal cycler chassis, CFX Connect optical reaction module, CFX Manager software, license for qbase+ software, communication cable, reagents, consumables
1855201	CFX Connect Real-Time PCR Detection System , includes CFX Connect thermal cycler chassis, CFX Connect optical reaction module, CFX Manager software, license for qbase+ software, communication cable
Accessories	
1845098	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
HSP9601	Hard-Shell Low-Profile 96-Well Skirted PCR Plates , white shell, clear well, 50
MSB1001	Microseal 'B' Adhesive Seals , optically clear, package of 100
1709799	Real-Time PCR Applications Guide
1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
1814030	Optically Clear Heat Seal , package of 100

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 quantitative PCR (qPCR).

The CFX96 Touch real-time PCR detection system makes it easy to:

- Rapidly screen expression from a few to hundreds of genes with PrimePCR™ assay panels. Just drag and drop the run file to start runs with a single click
- Monitor amplification traces on the touch screen in real time. At run completion, automatically receive the data file for remote monitoring and data analysis
- Conserve your samples and reagents with true five-target multiplexing
- Expand your qPCR throughput with a simple upgrade to the CFX384™ optical reaction module
- Save time and reduce costs by optimizing assays in a single run using the thermal gradient



For More Information

Web: www.bio-rad.com/cfx96-pcr

Request or download bulletins: 6075, 6076, and 6093

Ordering Information

Catalog #	Description
1845096*	CFX96 Optical Reaction Module , for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase+ software, communication cable, reagents, consumables
1845097*	CFX96 Optical Reaction Module , for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase+ software, communication cable
1855196	CFX96 Touch Real-Time PCR Detection System , includes C1000 Touch thermal cycler chassis, CFX96 optical reaction module, CFX Manager software, license for qbase+ software, communication cable, reagents, consumables
1855195	CFX96 Touch Real-Time PCR Detection System , includes C1000 Touch thermal cycler chassis, CFX96 optical reaction module, CFX Manager software, license for qbase+ software, communication cable

Accessories

1845098	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
TLS0801	Low-Profile 8-Tube Strips without Caps (0.2 ml) , clear, 120 strips (960 tubes)
TCS0803	Optical Flat 8-Cap Strips , for 0.2 ml PCR tubes and plates, ultraclear, 120
HSP9601	Hard-Shell Low-Profile 96-Well Skirted PCR Plates , white shell, clear well, 50
MSB1001	Microseal 'B' Adhesive Seals , optically clear, package of 100
1709799	Real-Time PCR Applications Guide
1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
1814030	Optically Clear Heat Seal , package of 100

* Order to upgrade an existing C1000 or C1000 Touch thermal cycler.

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 reaction volumes. The system incorporates industry-leading technology to provide robust and reliable results.

The CFX96 Touch deep well real-time PCR detection system makes it easy to:

- Use reaction volumes up to 125 µl
- Rapidly screen expression from a few to hundreds of genes with PrimePCR™ assay panels. Just drag and drop the run file to start runs with a single click
- Monitor amplification traces on the touch screen in real time. At run completion, automatically receive the data file for remote monitoring and data analysis
- Conserve your samples and reagents with true five-target multiplexing
- Save time and reduce costs by optimizing assays in a single run using the thermal gradient



For More Information

Web: www.bio-rad.com/CFX96DeepWell

Request or download bulletins: 6238 and 6243

Ordering Information

Catalog #	Description
1844096*	CFX96 Deep Well Optical Reaction Module , for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase+ software, communication cable, reagents, consumables
1844095*	CFX96 Deep Well Optical Reaction Module , for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase+ software, communication cable
1854096	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+ software, communication cable, reagents, consumables
1854095	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+ software, communication cable

Accessories

1845098	CFX Qualification Plate , 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch Deep Well, or CFX Connect system, includes 1 predisposed plate containing supermix, primer mix, nuclease-free water
TLS0801	Low-Profile 8-Tube Strips without Caps (0.2 ml) , clear, 120 strips (960 tubes)
TCS0803	Optical Flat 8-Cap Strips , for 0.2 ml PCR tubes and plates, ultraclear, 120
HSP9601	Hard-Shell Low-Profile 96-Well Skirted PCR Plates , white shell, clear well, 50
MSB1001	Microseal 'B' Adhesive Seals , optically clear, package of 100
1709799	Real-Time PCR Applications Guide
1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
1814030	Optically Clear Heat Seal , package of 100

* 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:

- Rapidly screen expression of hundreds of genes with PrimePCR™ assay panels. Just drag and drop the run file to start runs with a single click
- Verify the performance of your CFX real-time PCR detection system using the CFX qualification plate, system test software, IQ/OQ, and automated data quality control
- Integrate a laboratory information management system (LIMS) using built-in LIMS file management
- Combine the CFX384 Touch system with good laboratory practice standards by using CFX Manager™ software, Security Edition, which complies with U.S. FDA 21 CFR Part 11 regulations, for data collection and analysis



For More Information

Web: www.bio-rad.com/cfx384-pcr

Request or download bulletins: 6072, 6077, and 6096

Ordering Information

Catalog #	Description
1845384*	CFX384 Optical Reaction Module , for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase+ software, communication cable, reagents, consumables
1845385*	CFX384 Optical Reaction Module , for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase+ software, communication cable
1855484	CFX384 Touch Real-Time PCR Detection System , includes C1000 Touch thermal cycler chassis, CFX384 optical reaction module, CFX Manager software, license for qbase+ software, communication cable, reagents, consumables
1855485	CFX384 Touch Real-Time PCR Detection System , includes C1000 Touch thermal cycler chassis, CFX384 optical reaction module, CFX Manager software, license for qbase+ software, communication cable

Accessories

1845099	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
HSP3805	Hard-Shell 384-Well Standard PCR Plates , clear shell, white well, 50
MSB1001	Microseal 'B' Adhesive Seals , optically clear, package of 100
1709799	Real-Time PCR Applications Guide
1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
1814030	Optically Clear Heat Seal , package of 100

* Order to upgrade an existing C1000 or C1000 Touch thermal cycler.

See Also

PrimePCR assays and panels: page 380.
CFX qualification plate: page 377.

New CFX Automation System II

The CFX automation system II is ideally suited to meet the high-throughput PCR requirements of today's drug discovery and screening workflows. It works with up to two CFX real-time PCR detection systems to enable walk-away, high-throughput quantitative PCR (qPCR) operation. Each rack can hold up to forty-eight 384-well PCR plates or thirty-two 96-well plates, facilitating the generation of large volumes of data and rapid data analysis. The software is designed to work seamlessly with CFX systems, eliminating the need for automation system expertise. Powerful software features enable the pairing of cycling information with specific barcoded plates and the direct importing of barcode information from laboratory information management systems (LIMS). The intuitive calibration wizard makes it simple to add CFX systems at any point or recalibrate the automation system when required.

The CFX automation system II makes it easy to:

- **Save valuable laboratory space** — a single plate handler can service 2 CFX systems in a compact footprint
- **Meet changing throughput demands** — scalable design enables beginning with 1 CFX system and adding another CFX system when required
- **Stay organized** — track samples using the barcode reader and integrate with LIMS
- **Save time** — seamless software integration with PrimePCR™ assays minimizes time-consuming setup and analysis
- **Analyze data when and where you want** — receive email notification with an attached data file at the completion of each run



For More Information

Web: www.bio-rad.com/cfxautomation

Ordering Information

Catalog #	Description
1845075	CFX Automation System II , includes plate handler and barcode scanner, mounting plate, automation software; does not include CFX Real-Time PCR detection system

PCR Instrument Validation Tool

Bio-Rad's PCR instrument validation tool allows you to easily test the performance of your real-time PCR system.

Instrument Validation Tool



CFX Connect™

CFX96 Touch™

CFX96 Touch™ Deep Well

CFX384 Touch™

CFX qualification plate	•	•	•	•
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CFX Qualification Plate

The CFX qualification plate is an easy-to-use tool for validating the performance of your CFX system. The plate is predisposed with an optimized assay, 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
- Ability to generate a full PDF report with CFX Manager™ software



For More Information

Web: www.bio-rad.com/cfxqualification

Request or download bulletin: 6323

Ordering Information

Catalog #	Description
1845098	CFX Qualification Plate , 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch deep well, or CFX Connect system, includes 1 predisposed plate containing supermix, primer mix, nuclease-free water
1845099	CFX Qualification Plate , 384-well format, for use with CFX384 or CFX384 Touch system, includes 1 predisposed plate containing supermix, primer mix, 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 SP3, Windows 7, Windows 8
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 Touch™, CFX96 Touch™ Deep Well, CFX Connect™, and CFX384 Touch™ real-time PCR detection systems. Bio-Rad® PrimePCR™ assay users will benefit from full software integration, from one-click run start to automated 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
- Run a wide range of applications such as relative gene expression, genotyping, absolute quantification, and more

- 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
1845000	CFX Manager Software , includes installation CD, quick guides, instruction manual

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 7, or Windows 8 username and password for login. The software 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 ensures that 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.

For More Information

Web: www.bio-rad.com/cfx-manager-software-security-edition
Request or download bulletin: 5690

Ordering Information

Catalog #	Description
1845001	CFX Manager Software, Security Edition , includes 1 user license, installation CD, HASP HL key
1845005	CFX Manager Software, Security Edition , includes 5 user licenses, 5 installation CDs, 5 HASP HL keys
1845010	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 7, and Windows 8 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
1845008	CFX Manager Software, Chinese Edition , includes 3 user licenses, installation CD, 3 HASP HL keys
1845028	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 systems 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
1845025	Precision Melt Analysis Software , includes 2 user licenses, installation CD, 2 HASP HL keys, melt calibration kit
1845015	Precision Melt Analysis Software Only , includes 2 user licenses, installation CD, 2 HASP HL keys
1845020	Melt Calibration Kit , includes melt calibration DNA standard, melt primers, precision melt supermix

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).

See Also

iScript advanced cDNA synthesis kit for RT-qPCR: page 381.

SsoAdvanced™ universal SYBR® Green supermix: page 385.

SsoAdvanced universal probes supermix: page 386.

PrimePCR™ Assays and Panels

Wet-Lab Validated for Guaranteed Performance

Wet-lab validation of every primer 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™ universal SYBR® Green supermix. 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

Wide Range of Pathway and Collection Panels

Predesigned plates are available for signaling and disease pathways 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.

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 qPCR product family includes:

- **Predesigned primer assays** — genome-wide human, mouse, and rat primer assays for SYBR® Green gene expression analysis available in 200, 1,000, and 2,500 reactions
- **Predesigned probe assays** — human, mouse, and rat 5' nuclease probe assays for gene expression analysis available in 500, 1,000, and 2,500 reactions



- **Custom assays** — order your primer and probe sequences of interest, available in 200, 500, 1,000, and 2,500 reactions
- **Custom PCR plates** — custom-configured 96- and 384-well PCR plates
- **Pathway and collection panels** — predesigned 96- and 384-well PCR pathway and collection panels
- **DNA templates** — 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
- **Reference gene assays** — commonly used reference gene assays are available to normalize for variation in the amount of input mRNA among samples
- **PreAmp assays** — assays for the unbiased, target-specific preamplification of up to 100 gene targets in a single reaction

PrimePCR assays are also available for ddPCR. Please see page 365 for more information.

For More Information

Web: www.bio-rad.com/PrimePCR

Download bulletins: 6262, 6263, and 6290

Ordering Information

To place an order, visit www.bio-rad.com/PrimePCR.

PCR Reagents

PCR reagents, such as ready-to-use 2x supermixes and cDNA synthesis kits, are optimized for PCR, reverse transcription (RT), or quantitative PCR (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 RNaseA 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

www.bio-rad.com/iscrpt

www.bio-rad.com/rt_tutorial

Reverse Transcription Reagents

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

	Maximize data from single 20 µl reaction	Single tube	Fast and easy to use	Select my own primers
Product	iScript Advanced cDNA Synthesis Kit for RT-qPCR	iScript Reverse Transcription Supermix for RT-qPCR	iScript cDNA Synthesis Kit	iScript Select cDNA Synthesis Kit
Total RNA Input Range	7.5 µg–100 fg	1 µg–1 pg	1 µg–100 fg	1 µg–1 pg
Format	2 tubes	1 tube	2 tubes	5 tubes
Sample Input Volume	15 µl	16 µl	15 µl	15 µl
Time to Produce cDNA	35 min	40 min	40 min	40–90 min

iScript Reverse Transcription Supermix for RT-qPCR

- 1-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 your sample
- Liquid format at –20°C offers superior stability and eliminates freeze/thaw cycle
- Superior sensitivity and broad linear dynamic range for RT (1 µg–1 pg)
- 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

- 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 Advanced cDNA Synthesis Kit for RT-qPCR	
1725037	iScript Advanced cDNA Synthesis Kit for RT-qPCR , 25 x 20 µl reactions, includes 100 µl 5x iScript advanced reaction mix, 25 µl iScript advanced reverse transcriptase, and nuclease-free water
1725038	iScript Advanced cDNA Synthesis Kit for RT-qPCR , 100 x 20 µl reactions, includes 400 µl 5x iScript advanced reaction mix, 100 µl iScript advanced reverse transcriptase, and nuclease-free water
iScript Reverse Transcription Supermix for RT-qPCR	
1708840	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
1708841	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 cDNA Synthesis Kit	
1708890	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
1708891	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	
1708896	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
1708897	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

iScript Advanced cDNA Synthesis Kit for RT-qPCR

- | | |
|---------|--|
| 1725037 | iScript Advanced cDNA Synthesis Kit for RT-qPCR , 25 x 20 µl reactions, includes 100 µl 5x iScript advanced reaction mix, 25 µl iScript advanced reverse transcriptase, and nuclease-free water |
| 1725038 | iScript Advanced cDNA Synthesis Kit for RT-qPCR , 100 x 20 µl reactions, includes 400 µl 5x iScript advanced reaction mix, 100 µl iScript advanced reverse transcriptase, and nuclease-free water |

iScript Reverse Transcription Supermix for RT-qPCR

- | | |
|---------|--|
| 1708840 | 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 |
| 1708841 | 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 cDNA Synthesis Kit

- | | |
|---------|--|
| 1708890 | 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 |
| 1708891 | 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

- | | |
|---------|---|
| 1708896 | 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 |
| 1708897 | 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 are tested for reliable amplification over a wide dynamic range of input template: genomic DNA (gDNA), complementary DNA (cDNA), and plasmid DNA (pDNA).

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



Property	SsoAdvanced™ Universal Supermixes	iTaq™ Universal Supermixes	iQ™ Supermixes
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	•••	•••	—

New SsoAdvanced™ Universal Inhibitor-Tolerant SYBR® Green Supermix

SsoAdvanced™ universal inhibitor-tolerant SYBR® Green supermix is a high-performance real-time PCR supermix based on Bio-Rad's patented* Sso7d fusion protein technology. This supermix is specifically formulated for use with difficult target sequences in a wide range of challenging sample types including crude lysates. The dsDNA binding protein, Sso7d, stabilizes the polymerase-template complex, providing superior PCR inhibitor tolerance, increased processivity and specificity, and greater speed without affecting PCR sensitivity, efficiency, or reproducibility.

Product features include:

- **Skip RNA and DNA extraction by using crude samples** — achieve superior data using crude lysates from plants, seeds, cells, or bacteria, or formalin-fixed, paraffin-embedded (FFPE) samples
- **Power through PCR inhibitors** — unrivaled performance with common PCR inhibitors, such as heparin, polysaccharides, and culture media
- **Obtain high-quality data with fast cycling across a broad range of conditions** — optimal results over wide variations in reaction conditions, primer concentrations, and temperatures



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

- **Rapid polymerization kinetics and instant polymerase activation** — decrease time to results without compromising real-time quantitative PCR (RT-qPCR) data quality
- **Obtain better results with Bio-Rad's PrimePCR™ assays** — real-time PCR assays are expertly designed and wet-lab validated to ensure optimal assay performance
- **Increase cDNA loading** — add up to 20% cDNA from our iScript™ advanced cDNA synthesis kit for RT-qPCR or iScript reverse transcription supermix for RT-qPCR
- Use with any real-time PCR system

* U.S. patents 6,627,424; 7,541,170; and 7,560,260.

PCR Reagents

Real-Time qPCR Supermixes

www.bio-rad.com/pcrreagents

Ordering Information

Catalog #	Description
1725016	SsoAdvanced Universal Inhibitor-Tolerant SYBR Green Supermix , 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725017	SsoAdvanced Universal Inhibitor-Tolerant SYBR Green Supermix , 5 ml (1 x 5 ml vial), 500 x 20 µl reactions
1725018	SsoAdvanced Universal Inhibitor-Tolerant SYBR Green Supermix , 10 ml (2 x 5 ml vials), 1,000 x 20 µl reactions

New SsoAdvanced™ PreAmp Supermix

SsoAdvanced PreAmp supermix is a 2x concentrated, ready-to-use reaction master mix optimized for unbiased, target-specific preamplification of cDNA and genomic DNA (gDNA). This supermix preamplifies DNA templates using up to 100 PrimePCR™ PreAmp SYBR® Green or probe qPCR assays, custom-designed SYBR® Green — and probe-based assays (5' nuclease), and TaqMan assays.

Preamplification of Targets without Bias Is Key

To obtain valid real-time PCR and end-point PCR data from limited samples, preamplification is often required. Some methods have been shown to introduce bias across the transcriptome/genome when comparing preamplified and nonpreamplified samples. SsoAdvanced PreAmp supermix is the first supermix that truly provides unbiased preamplification reactions regardless of the targets present in the reaction master mix, enabling more data to be obtained from a limited source.



- **Limited template DNA** — start with as little as 100 pg of cDNA or gDNA from any precious or limited sample, such as stem cells, laser capture microdissections, and formalin-fixed paraffin-embedded tissues
- **Versatile usability and applications** — perform real-time or end-point PCR (single nucleotide polymorphism genotyping) on up to 100 SYBR® Green– or probe-based targets with a simple, streamlined workflow
- **Compatible with various assays** — PrimePCR™ PreAmp assays, custom-designed assays, and TaqMan assays

For More Information

Web: www.bio-rad.com/PreAmp

Request or download bulletin: 6576

Ordering Information

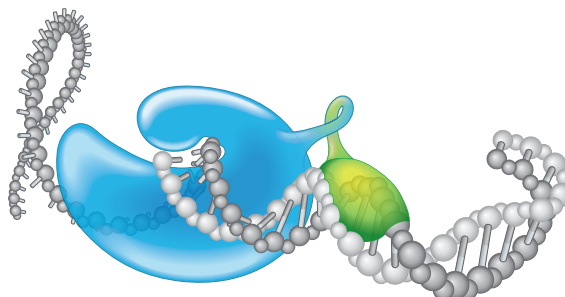
Catalog #	Description
1725160	SsoAdvanced PreAmp Supermix , 1.25 ml (1 x 1.25 ml vial), 50 x 50 µl reactions

SsoAdvanced™ Universal SYBR® Green Supermix

SsoAdvanced™ universal SYBR® Green supermix is a high-performance real-time PCR supermix based on Bio-Rad's patented* Sso7d fusion protein technology. This supermix is formulated for a wide range of real-time PCR applications and for use with all ROX dependent or independent real-time PCR systems. The dsDNA binding protein, Sso7d, stabilizes the polymerase-template complex, providing superior inhibitor tolerance, increased processivity, specificity, and greater speed without affecting PCR sensitivity, efficiency, or reproducibility.

SsoAdvanced™ universal SYBR® Green supermix lets you:

- **Use any real-time PCR system** — the universal reference dye in this supermix enables ROX normalization of qPCR data regardless of the ROX level requirements of the qPCR system
- **Achieve superior real-time PCR results under any conditions** — robust formulation delivers consistent performance in fast cycling across a broad range of reaction conditions, primer concentrations, and temperature ranges
- **Increase your qPCR sensitivity and efficiency of detection from compromised samples** — Sso7d fusion polymerase has increased resistance to a wide variety of PCR inhibitors, providing better sensitivity and overall performance
- **Decrease time to results without compromising qPCR data quality** — Sso7d fusion polymerase and optimized buffer together provide rapid polymerization kinetics and instant polymerase activation
- **Obtain better results with PrimePCR™ assays** — real-time PCR assays are expertly designed and wet-lab validated to ensure optimal assay performance



The dsDNA binding protein, Sso7d, stabilizes the polymerase-template complex, increases processivity, and provides greater speed and reduced reaction times compared to traditional DNA polymerases. Sso7d fusion polymerases are significantly more resistant to PCR inhibitors, making the SsoAdvanced supermixes ideal choices for challenging applications, such as direct qPCR, without the need for sample preparation.

Applications and Uses of SsoAdvanced™ Universal SYBR® Green Supermix

- qPCR/real-time PCR
- Gene expression analysis
- Pathway analysis
- Absolute quantification
- Chromatin immunoprecipitation (ChIP) qPCR
- Mutation detection
- Pathogen detection
- Viral detection (load)
- Characterization of genetically modified organisms (GMO)
- Genetic profiling

Instrument Compatibility

The SsoAdvanced universal SYBR® Green supermix is compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information

Web: www.bio-rad.com/supermixes

View the Universal Real-Time PCR Reagents Web App:

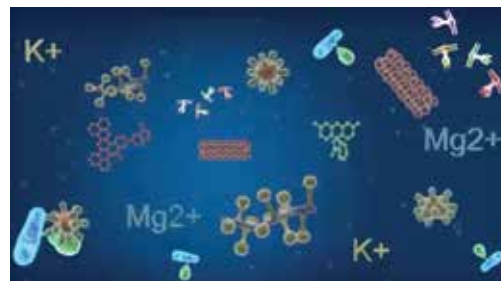
www.bio-rad.com/App/UniversalSupermixes

SsoAdvanced™ Universal Probes Supermix

SsoAdvanced universal probes supermix is a high-performance real-time PCR supermix based on Bio-Rad's patented* Sso7d fusion protein technology. This supermix is formulated for a wide range of real-time PCR applications and for use with all ROX dependent or independent real-time PCR systems. The dsDNA binding protein, Sso7d, stabilizes the polymerase-template complex, providing superior inhibitor tolerance, increased processivity, better specificity, and greater speed without affecting PCR sensitivity, efficiency, or reproducibility.

SsoAdvanced universal probes supermix lets you:

- **Carry out high-performance singleplex and multiplex reactions** — Sso7d fusion polymerase and advanced formulation enable robust performance in singleplex or multiplex real-time PCR reactions, providing the highest data precision and allowing cost and time savings when combining 2 assays in a single well
- **Use any real-time PCR system** — the universal reference dye in this supermix enables ROX normalization of qPCR data regardless of the ROX level requirements of the qPCR system
- **Achieve superior real-time PCR results under any conditions** — robust formulation delivers consistent performance in fast cycling across a broad range of reaction conditions, primer concentrations, and temperature ranges
- **Increase your qPCR sensitivity and efficiency of detection from compromised samples** — Sso7d fusion polymerase has increased resistance to a wide variety of PCR inhibitors, providing better sensitivity and overall performance
- **Decrease time to results without compromising qPCR data quality** — Sso7d fusion polymerase and optimized buffer together provide rapid polymerization kinetics and instant polymerase activation



Robust formulation containing advanced components delivers superior and consistent performance in standard and fast cycling conditions across a broad range of reaction conditions, primer concentrations, and temperature ranges.

Applications and Uses of SsoAdvanced Universal Probes Supermix

- qPCR/real-time PCR
- Gene expression analysis
- Absolute quantification
- Multiplexing
- Genotyping (allelic discrimination)
- Mutation detection
- Pathogen detection
- Viral detection (load)
- Characterization of GMOs
- Genetic profiling

Instrument Compatibility

The SsoAdvanced universal probes supermix is compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information

Web: www.bio-rad.com/supermixes

View the Universal Real-Time PCR Reagents Web App:
www.bio-rad.com/App/UniversalSupermixes

Ordering Information

Catalog #	Description
1725270	SsoAdvanced Universal SYBR Green Supermix, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725271	SsoAdvanced Universal SYBR Green Supermix, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725272	SsoAdvanced Universal SYBR Green Supermix, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725274	SsoAdvanced Universal SYBR Green Supermix, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
1725275	SsoAdvanced Universal SYBR Green Supermix, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions
1725280	SsoAdvanced Universal Probes Supermix, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725281	SsoAdvanced Universal Probes Supermix, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725282	SsoAdvanced Universal Probes Supermix, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725284	SsoAdvanced Universal Probes Supermix, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
1725285	SsoAdvanced Universal Probes Supermix, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions

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

Web: www.bio-rad.com/supermixes

View the Universal Real-Time PCR Reagents Web App:

www.bio-rad.com/App/UniversalSupermixes

Ordering Information

Catalog # Description

1725120	iTaq Universal SYBR Green Supermix, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725121	iTaq Universal SYBR Green Supermix, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725122	iTaq Universal SYBR Green Supermix, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725124	iTaq Universal SYBR Green Supermix, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
1725125	iTaq Universal SYBR Green Supermix, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions
1725130	iTaq Universal Probes Supermix, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725131	iTaq Universal Probes Supermix, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725132	iTaq Universal Probes Supermix, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725134	iTaq Universal Probes Supermix, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
1725135	iTaq Universal Probes Supermix, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions

* U.S. patents 6,627,424; 7,541,170; and 7,560,260.

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 10⁶-fold difference in expression 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, single nucleotide polymorphism (SNP) genotyping, SNP analysis, GMO detection, and viral load detection

For More Information

Request or download bulletin: 6090

Ordering Information

Catalog #	Description
1708880	iQ SYBR Green Supermix, 2.5 ml (2 x 1.25 ml vials), 100 x 50 µl reactions
1708882	iQ SYBR Green Supermix, 12.5 ml (10 x 1.25 ml vials), 500 x 50 µl reactions
1708884	iQ SYBR Green Supermix, 25 ml (20 x 1.25 ml vials), 1,000 x 50 µl reactions
1708885	iQ SYBR Green Supermix, 50 ml (50 ml bottle), 2,000 x 50 µl reactions
1708886	iQ SYBR Green Supermix, 25 ml (5 x 5 ml vials), 1,000 x 50 µl reactions
1708887	iQ SYBR Green Supermix, 50 ml (10 x 5 ml vials), 2,000 x 50 µl reactions
1708860	iQ Supermix, 2.5 ml (2 x 1.25 ml vials), 100 x 50 µl reactions
1708862	iQ Supermix, 12.5 ml (10 x 1.25 ml vials), 500 x 50 µl reactions
1708864	iQ Supermix, 25 ml (20 x 1.25 ml vials), 1,000 x 50 µl reactions
1725848	iQ Multiplex Powermix, 1.25 ml (1 x 1.25 ml vial), 50 x 50 µl reactions
1725849	iQ Multiplex Powermix, 5 ml (4 x 1.25 ml vials), 200 x 50 µl reactions

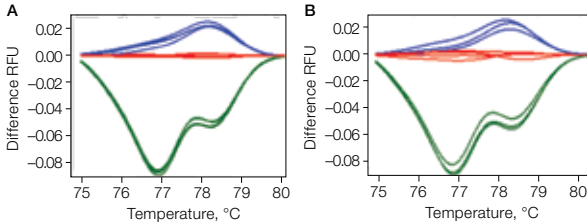
Precision Melt Supermix (HRM)

- Sensitive and specific discrimination of class I–IV SNPs across a broad range of amplicons
- Ideal solution for insertions or deletions >6 base pairs
- De novo SNP discovery
- Accurate detection of the percentage of CpG methylation status for epigenetic studies
- Ideal for mutation screening of small mutations or when using a primer walking approach for larger regions
- Exceptional room temperature stability for high-throughput HRM studies
- Optimized formulation containing EvaGreen dye delivers robust PCR and HRM performance

For More Information

Web: www.bio-rad.com/supermixes

Request or download bulletins: 5798 and 6137



Exceptional stability enables high-throughput genotyping analysis with precision melt supermix. Specific amplification and accurate discrimination of a class IV SNP (84 bp amplicon) from mouse genomic DNA was performed on a CFX384™ real-time PCR detection system either 0 hr (A) or 48 hr (B) after reaction setup. Wild type (n), heterozygote (n), and homozygous mutant (n) are shown in the difference plots normalized to wild-type samples. Total run time including melt curve = 150 min. RFU, relative fluorescence units.

Ordering Information

Catalog #	Description
1725110	Precision Melt Supermix , 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725112	Precision Melt Supermix , 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions

Real-Time qPCR Reagents Selection Guide

Real-Time qPCR Instrument	SYBR® Green Supermixes				Probes Supermixes				One-Step Kits for RT-qPCR	
	SsoAdvanced™ Universal Inhibitor Tolerant SYBR® Green Supermix	SsoAdvanced™ Universal SYBR® Green Supermix	iTaq™ Universal SYBR® Green Supermix	iQ™ SYBR® Green Supermix	SsoAdvanced Universal Probes Supermix	iTaq Universal Probes Supermix	iQ Supermix	iQ Multiplex Powermix	iTaq™ Universal SYBR® Green One-Step Kit	iTaq Universal Probes One-Step Kit
Bio-Rad										
CFX96™, CFX96 Touch™, CFX384™, CFX384 Touch™, CFX Connect™	•	•	•	•	•	•	•	•	•	•
iQ™, iQ™5, MyiQ™, MyiQ™2	•	•	•	•	•	•	•	•	•	•
MiniOpticon™, DNA Engine Opticon® 1 and 2	•	•	•	•	•	•	•	•	•	•
Applied Biosystems										
StepOne/StepOne Plus	•	•	•	◆	•	•	◆	◆	•	•
7500, ViiA 7	•	•	•	—	•	•	—	—	•	•
7000, 7300, 7700, 7900HT	•	•	•	—	•	•	—	—	•	•
QuantStudio 12K flex	•	•	•	•	•	•	•	•	•	•
Stratagene										
Mx3000P, 3005P, 4000	•	•	•	•	•	•	•	•	•	•
Eppendorf										
Mastercycler ep realplex 2 or 4	•	•	•	•	•	•	•	•	•	•
QIAGEN/Corbett										
Rotor-Gene 3000, 6000, Q	•	•	•	•	•	•	•	•	•	•
Roche										
LightCycler 480	•	•	•	•	•	•	•	•	•	•
LightCycler 96	•	•	•	•	•	•	•	•	•	•
LightCycler 1.0, 1.5, 2.0	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Illumina										
Eco	•	•	•	•	•	•	•	•	•	•
Thermo Scientific										
PikoReal	•	•	•	•	•	•	•	•	•	•
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

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 tutorial 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

View [Understanding Real-Time PCR Supermixes](#)

Web: www.bio-rad.com/supermixes_tutorial

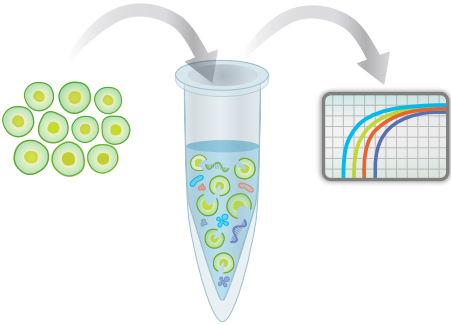


Real-Time PCR Kits

New SingleShot™ Cell Lysis Kit

Use the SingleShot cell lysis kit to rapidly generate cell lysates that are optimized for reverse transcription quantitative PCR (RT-qPCR) analysis without RNA purification. Kit works on 10–100,000 cells in 20 minutes while providing the following key benefits:

- Complete removal of genomic DNA without the need for purification
- Preservation of RNA integrity by an RNase inhibitor
- Simple, short protocol suitable for automation and high-throughput experiments
- No loss of rare transcripts from column purification
- Optimal accuracy and high sensitivity of qPCR data
- Validated with PrimePCR™ assays and panels
- Results comparable to those when using purified RNA
- Optimal performance with the use of an internal control (sold separately)



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

See Also

PCR plastic consumables:
page 397.

Ordering Information

Catalog #	Description
1725080	SingleShot Cell Lysis Kit , 100 x 50 µl reactions
1725081	SingleShot Cell Lysis Kit , 500 x 50 µl reactions

One-Step Kits

1725070	SingleShot Probes One-Step Kit , 100 x 50 µl reactions
1725095	SingleShot SYBR Green One-Step Kit , 100 x 50 µl reactions

Two-Step Kits

1725090	SingleShot Probes Kit , 100 x 50 µl reactions
1725085	SingleShot SYBR Green Kit , 100 x 50 µl reactions

PCR Reagents

Real-Time PCR Kits

www.bio-rad.com/pcrreagents

See Also

PCR plastic consumables:
page 397.

New SingleShot™ Two-Step Kits

SingleShot two-step kits contain all the reagents needed for obtaining high-performance reverse transcription quantitative PCR (RT-qPCR) data directly from cell culture lysates in a two-step workflow in less than 2 hours after cell lysis. Kits with SYBR® Green or probe chemistry are available.

Features include:

- Cell lysate from 10–100,000 cells ready in 20 minutes
- Complete removal of genomic DNA without the need for purification
- Preservation of RNA integrity by an RNase inhibitor
- Simple, short protocol suitable for automation and high-throughput experiments
- No loss of rare transcripts from column purification
- Optimal accuracy and high sensitivity of qPCR data

- Validated with PrimePCR™ assays and panels
- Results comparable to those from workflows using purified RNA with SYBR® Green or probes
- SingleShot RNA control included to ensure optimal input cells and lysates



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

Ordering Information

Catalog #	Description
1725090	SingleShot Probes Kit , 100 x 50 µl reactions
1725085	SingleShot SYBR Green Kit , 100 x 50 µl reactions

New SingleShot™ One-Step Kits

SingleShot one-step kits contain all the reagents needed for obtaining high-performance reverse transcription quantitative PCR (RT-qPCR) data directly from cell culture lysates in a one-step workflow within 1 hour after cell lysis. Kits with SYBR® Green or probe chemistry are available.

Features include:

- Cell lysate from 10–100,000 cells ready in 20 minutes
- Complete removal of genomic DNA without the need for purification
- Linear dynamic range across genes
- Preservation of RNA integrity by an RNase inhibitor
- Simple, short protocol suitable for automation and high-throughput experiments
- No loss of rare transcripts from column purification
- Optimal accuracy and high sensitivity of qPCR data

- Validated with PrimePCR™ assays and panels
- Results comparable to those from workflows using purified RNA with SYBR® Green or probes
- SingleShot RNA control included to ensure optimal input cells and lysates



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

Ordering Information

Catalog #	Description
1725070	SingleShot Probes One-Step Kit , 100 x 50 µl reactions
1725095	SingleShot SYBR Green One-Step Kit , 100 x 50 µl reactions

iTaq™ Universal SYBR® Green One-Step Kit

The iTaq™ Universal SYBR® Green One-Step Kit is a fast and convenient solution for real-time PCR using the powerful combination of RNase H+ MMLV reverse transcriptase, RT inhibitor reducer and hot-start iTaq DNA polymerase in one fast reaction. It provides improved PCR efficiency, wider dynamic range, superior sensitivity and better specificity, and inhibitor tolerance without affecting performance, even with cell lysates.

- **Increase sensitivity, specificity, and efficiency** — advanced formulation enables robust performance and increased resistance to a wide variety of sample types and target sequences
- **Use any real-time PCR system** — the universal reference dye in this reaction mix enables ROX normalization of qPCR data regardless of the ROX level requirements of the qPCR system
- **Achieve superior real-time PCR results under any condition** — robust formulation delivers consistent performance in fast cycling across a broad range of reaction conditions, primer concentrations, and temperature ranges
- **Obtain better results with PrimePCR™ assays** — real-time PCR assays are expertly designed and wet-lab validated to ensure optimal assay performance



Applications and Uses of iTaq™ Universal SYBR® Green One-Step Kit

- qPCR/real-time PCR
- Gene expression analysis
- Absolute quantification
- Mutation detection
- Pathogen detection
- Viral detection (load)
- Characterization of GMOs
- Genetic profiling

Instrument Compatibility

The iTaq™ universal SYBR® Green one-step kit is compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information

Web: www.bio-rad.com/supermixes

View the Universal Real-Time PCR Reagents Web App:
www.bio-rad.com/App/UniversalSupermixes

See Also

PCR plastic consumables:
page 397.

Ordering Information

Catalog # Description

iTaq Universal SYBR Green One-Step Kit

1725150	iTaq Universal SYBR Green One-Step Kit, 100 reactions, includes 1 ml (1 x 1 ml vial), 25 µl RT (1 vial), nuclease-free water (1 vial)
1725151	iTaq Universal SYBR Green One-Step Kit, 500 reactions, includes 5 ml (5 x 1 ml vials), 125 µl RT (1 vial), nuclease-free water (1 vial)

iTaq™ Universal Probes One-Step Kit

The iTaq universal probes one-step kit is a fast and convenient solution for real-time PCR using the powerful combination of RNase H+ MMLV reverse transcriptase and hot-start iTaq DNA polymerase in one fast reaction. It provides improved PCR efficiency, wider dynamic range, superior sensitivity and specificity, and inhibitor tolerance without affecting performance, even with cell lysates.

- **Increase sensitivity, specificity, and efficiency** — advanced formulation enables robust performance and increased resistance to a wide variety of sample types and target sequences
- **Obtain superior results with multiplex reactions** — enhanced chemistry enables up to 3 target amplifications at the same time, resulting in higher data precision with fewer pipet steps and reduced sample usage
- **Carry out high-throughput real-time PCR screening and validation** — simplified workflow and reduced cycling times enable screening and validation of a great number of samples and targets in a short period of time
- **Use any real-time PCR system** — the universal reference dye in this reaction mix enables ROX normalization of qPCR data regardless of the ROX level requirements of the qPCR system
- **Achieve superior real-time PCR results under any conditions** — robust formulation delivers consistent performance in fast cycling across a broad range of reaction conditions, primer concentrations, and temperature ranges



Applications and Uses of iTaq Universal Probes One-Step Kit

- qPCR/real-time PCR
- Gene expression analysis
- Multiplexing
- Absolute quantification
- Mutation detection
- Pathogen detection
- Viral detection (load)
- Characterization of GMOs
- Genetic profiling

Instrument Compatibility

The iTaq universal probes one-step kit is compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information

Web: www.bio-rad.com/supermixes

View the Universal Real-Time PCR Reagents Web App:
www.bio-rad.com/App/UniversalSupermixes

Ordering Information

Catalog #	Description
iTaq Universal SYBR Green One-Step Kit	
1725140	iTaq Universal Probes One-Step Kit, 100 reactions, 1 ml (1 x 1 ml vial), includes 50 µl RT (1 x 50 µl vial), nuclease-free water (1-vial)
1725141	iTaq Universal Probes One-Step Kit, 500 reactions, 5 ml (5 x 1 ml vials), includes 250 µl RT (2 x 125 µl vials), nuclease-free water (1 vial)

iTaq Universal SYBR Green One-Step Kit

1725140 iTaq Universal Probes One-Step Kit, 100 reactions, 1 ml (1 x 1 ml vial), includes 50 µl RT (1 x 50 µl vial), nuclease-free water (1-vial)

1725141 iTaq Universal Probes One-Step Kit, 500 reactions, 5 ml (5 x 1 ml vials), includes 250 µl RT (2 x 125 µl vials), nuclease-free water (1 vial)

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 or HF high-fidelity buffers

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
- The hot-start 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

1725300	iProof High-Fidelity DNA Polymerase, 2 U/μl, 20 U, includes 5x reaction buffers, MgCl ₂ solution, DMSO
1725301	iProof High-Fidelity DNA Polymerase, 2 U/μl, 100 U
1725302	iProof High-Fidelity DNA Polymerase, 2 U/μl, 500 U
1725330	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
1725310	iProof HF Master Mix, 2.5 ml, 100 x 50 μl reactions (for highest fidelity with most templates)
1725320	iProof GC Master Mix, 2.5 ml, 100 x 50 μl reactions (for GC-rich templates)
1725391	5x iProof HF Buffer, 1.5 ml (for highest fidelity with most templates)
1725392	5x iProof GC Buffer, 1.5 ml (for GC-rich templates)
1725393	5x iProof HPLC HF Buffer, 1.5 ml
1725394	5x iProof HPLC GC Buffer, 1.5 ml

ROX Passive Reference Dye

1725858	ROX Passive Reference Dye, 0.5 ml
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dNTP Mix

1708874	dNTP Mix, 200 μl premixed solution, contains 10 mM each dNTP (dATP, dCTP, dGTP, dTTP)
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iTaq DNA Polymerase

1708870	iTaq DNA Polymerase, 5 U/μl, includes 250 U polymerase, 1.25 ml 10x PCR buffer
1708875	iTaq DNA Polymerase, 5 U/μl, includes 5,000 U polymerase, 25 ml 10x PCR buffer, 25 ml 50 mM MgCl ₂ solution

MgCl₂

1708872	MgCl ₂ Solution, 50 mM, 1.25 ml
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PCR Plate Sealer

See Also

Heat sealing
films and foils:
page 409.

SsoAdvanced™
universal SYBR®
Green supermix:
page 385.

iTaq™ universal SYBR®
Green supermix:
page 387.

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 startup 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 laboratory 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	
1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
Accessories	
1814080	Sealing Frame , extra sealing frame for use with PX1 PCR plate sealer, 1
1814085	Plate Support Block , extra plate support block for use with PX1 PCR plate sealer, 1
Heat Seals for PX1 PCR Plate Sealer	
1814030	Optically Clear Heat Seal , package of 100
1814035	Permanent Clear Heat Seal , package of 100
1814040	Pierceable Foil Heat Seal , package of 100
1814045	Peelable Foil Heat Seal , package of 100

PX1 PCR Plate Sealer

1814000 **PX1 PCR Plate Sealer**, includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord

Accessories

1814080 **Sealing Frame**, extra sealing frame for use with PX1 PCR plate sealer, 1

1814085 **Plate Support Block**, extra plate support block for use with PX1 PCR plate sealer, 1

Heat Seals for PX1 PCR Plate Sealer

1814030 **Optically Clear Heat Seal**, package of 100

1814035 **Permanent Clear Heat Seal**, package of 100

1814040 **Pierceable Foil Heat Seal**, package of 100

1814045 **Peelable Foil Heat Seal**, package of 100

For more information about the heat seals that are compatible with the PX1 PCR plate sealer, see page 407.

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

Product	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
	TBI-0201, TFI-0201, TWI-0201 page 399	TBC-xxxx*, TBS-xxxx* page 399	TLS-08xx* page 399	HSP-3xxx* page 402	HSR-48xx* page 402	MSS-xxxx* page 404	MSP-9xxx* page 404
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, ViiA 7)		•		•	•	•	
Applied Biosystems fast systems (7500 fast, 7900HT fast, StepOne, StepOnePlus, ViiA 7)			•	•	•		
Eppendorf Mastercycler ep <i>realplex</i>		•	•				•
Stratagene (Agilent) Mx series		•					
Corbett (QIAGEN) Rotor-Gene	•						
Roche LightCycler 480					•		
Other Instruments							
Applied Biosystems DNA sequencers (3100, 3700, 3730)				•		•	
Idaho Technology LightScanner				•			•

continues

PCR Plastic Consumables

Thin-Wall PCR Tubes

www.bio-rad.com/pcrplastics

Instrument Compatibility of PCR Plastic Consumables (cont.)

Product	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
	HSS-9xxx* page 402	HSP-9xxx* page 402	HSL-9xxx page 402	HSR-9xxx page 406	MLP-xxxx* page 403	MLL-xxxx* page 403	223-9441 page 404	CON-9601 page 405
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 7900HT		• Except 7900HT	
Applied Biosystems (StepOnePlus)						•		
Applied Biosystems (7500 fast, ViiA 7 fast)			•			•		
Applied Biosystems (QuantStudio 96 Standard)	•							
Eppendorf Mastercycler ep <i>realplex</i>	•	•	•		•	•	•	
Stratagene (Agilent) Mx series	•				•		•	
Roche LightCycler 480/96				•				
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

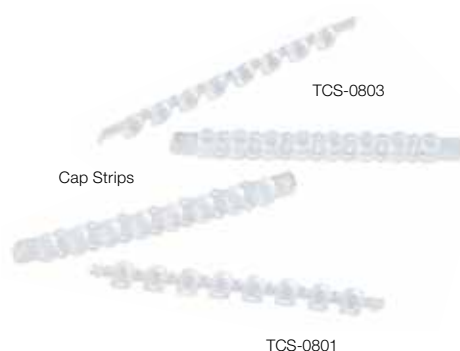
High-Profile PCR Tube Strips

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

PCR Plastic Consumables

PCR Plates

www.bio-rad.com/pcrplastics

Ordering Information

Catalog # Description

Individual PCR Tubes with Attached Caps (0.2 ml)

TFI0201 PCR Tubes with Flat Caps (0.2 ml), clear, 1,000

TWI0201 PCR Tubes with Domed Caps (0.2 ml), clear, 1,000

Individual PCR Tubes without Caps (0.2 ml)

TBI0201 PCR Tubes without Caps (0.2 ml), clear, 1,000

Individual PCR Tubes with Attached Caps (0.5 ml)

TBI0501 PCR Tubes with Flat Caps (0.5 ml), clear, 1,000 (2 bags of 500)

TBI0502 PCR Tubes with Flat Caps (0.5 ml), clear, 800 (8 bags of 100)

High-Profile Tube Strips without Caps (0.2 ml)

TBS0201 8-Tube Strips without Caps, clear, 125 strips (1,000 PCR tubes)

TBS1201 12-Tube Strips without Caps, clear, 100 strips (1,200 PCR tubes)

Low-Profile 8-Tube Strips without Caps (0.2 ml)

TLS0801 Low-Profile 8-Tube Strips without Caps, clear, 120 strips (960 PCR tubes)

TLS0851 Low-Profile 8-Tube Strips without Caps, white, 120 strips (960 PCR tubes)

Domed Cap Strips

TCS0801 Domed 8-Cap Strips, for PCR tubes and plates, clear, 130

TCS1201 Domed 12-Cap Strips, for PCR tubes and plates, clear, 200

Optical Flat Cap Strips

TCS0803 Optical Flat 8-Cap Strips, for PCR tubes and plates, ultraclear, 120

High-Profile Polypropylene Tube Strips with Domed Cap Strips (0.2 ml)

TBC0802 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)

TBC1202 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.

96-Place PCR Tube Racks and Covers



Easy Cap Tool



PCR Tube Rack



Strip Cap Tool

For More Information

Web: www.bio-rad.com/PCRplasticaccessories

Ordering Information

Catalog #	Description
TRC9601	PCR Tube Racks , ANSI/SBS standard, white, 10
TRC0501	96-Place Racks , with covers, for PCR tubes and unskirted and semi-skirted microplates, assorted colors, 5
ECT1000	Easy Cap Tool , ensures tight seal for 0.2 ml PCR tubes or 96-well microplates
ECT2000	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
MLP4801	Multiplate High-Profile 48-Well Unskirted PCR Plates , clear, 50 plates
MLL4801	Multiplate Low-Profile 48-Well Unskirted PCR Plates , clear, 50 plates
MLL4851	Multiplate Low-Profile 48-Well Unskirted PCR Plates , white, 50 plates

See Also

PX1 PCR plate sealer: page 396.

Heat sealing films and foils: page 409.

PCR plate seals: page 407.

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 barcode option

Hard-Shell Low-Profile 96-Well Skirted PCR Plates

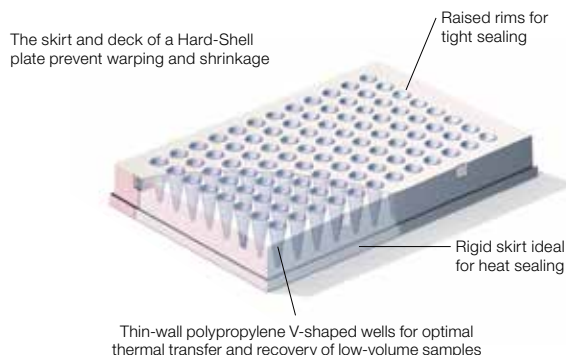
- Reaction volumes of 5–125 μl (200 μl maximum)
- Low-profile (16.06 mm) wells optimized for low-volume reactions and fast PCR
- Full skirt for robotic handling and labeling surface
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Barcoded plates are available

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
- Barcoded plates are available

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
- Barcoded plates are available



Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plate

Hard-Shell 96-Well 480 PCR Plates

Hard-Shell 96-well 480 PCR plates are optimized to work on the Roche LightCycler 480 and 96 systems with a 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 and 96
- 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
- Barcoded along row A
- 200 μl maximum volume

For More Information

Web: www.bio-rad.com/96wellpcrplates

Request or download bulletin: 5496

* U.S. patents 6,340,589, 6,528,302, and 7,347,977.

Ordering Information

Description	Clear Wells	White Wells	Black Wells
Hard-Shell Low-Profile 96-Well Skirted PCR Plates			
White shell, 50 plates	HSP9601	HSP9655	—
Red shell, 50 plates	HSP9611	—	—
Yellow shell, 50 plates	HSP9621	—	—
Blue shell, 50 plates	HSP9631	HSP9635	—
Green shell, 50 plates	HSP9641	HSP9645	—
Black shell, 50 plates	HSP9661	HSP9665	HSP9666
White shell, barcoded, 50 plates	HSP9901	HSP9955	—
White shell, bulk pack of 400 plates	HSP9601B	—	—
Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plates, 25 plates			
Clear shell	HSS9601	—	—
Green shell	HSS9641	—	—
Black shell	—	HSS9665	—
Clear shell, barcoded	HSS9901	—	—
Hard-Shell Low-Profile 96-Well Semi-Skirted PCR Plates, 25 plates			
Clear shell	HSL9601	HSL9605	—
Green shell	HSL9641	HSL9645	—
Clear shell, barcoded	HSL9901	HSL9905	—

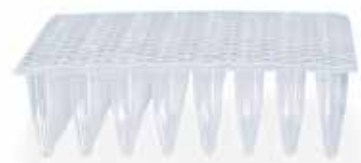
Catalog #	Description
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Hard-Shell 96-Well 480 PCR Plates

HSR9905	Hard-Shell 96-Well 480 PCR Plates , clear shell/white well PCR plate for use with Roche LightCycler 480 real-time PCR system, barcoded, rigid 2-component designs, 25 plates
HSR9905K	Hard-Shell 96-Well 480 PCR Plates Kit , for use with Roche LightCycler 480 real-time PCR system, includes 100 barcoded clear shell/white well PCR plates (4 packs of #HSR-9905) and 100 Microseal 'C' optical seals (#MSC-1001)
HSR9901	Hard-Shell 96-Well 480 PCR Plates , clear shell/clear well PCR plate for use with Roche LightCycler 480 real-time PCR system, barcoded, rigid 2-component design, 25 plates
HSR9901K	Hard-Shell 96-Well 480 PCR Plates Kit , for use with Roche LightCycler 480 real-time PCR system, includes 100 barcoded 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

PCR Plastic Consumables

PCR Plates

www.bio-rad.com/pcrplastics

Ordering Information

Catalog #	Description
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Multiplate High-Profile 96-Well Unskirted PCR Plates

MLP9601	Multiplate High-Profile 96-Well Unskirted PCR Plates, clear, 25 plates
MLP9651	Multiplate High-Profile 96-Well Unskirted PCR Plates, white, 25 plates
MLP9631	Multiplate High-Profile 96-Well Unskirted PCR Plates, blue, 25 plates

Multiplate Low-Profile 96-Well Unskirted PCR Plates

MLL9601	Multiplate Low-Profile 96-Well Unskirted PCR Plates, clear, 25 plates
MLL9651	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
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2239441	iQ High-Profile 96-Well Semi-Skirted PCR Plates, 25 plates
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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 barcoding. 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. Barcoded 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	
MSS9601	Microseal High-Profile 96-Well Semi-Skirted PCR Plates, clear, 25 plates
Microseal Low-Profile 96-Well Skirted PCR Plates	
MSP9601	Microseal Low-Profile 96-Well Skirted PCR Plates, clear, 50 plates
MSP9605	Microseal Low-Profile 96-Well Skirted PCR Plates, barcoded, 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
CON9601*	
Concord Low-Profile 96-Well Skirted Polycarbonate PCR Plates , clear, 25 plates	
CVR9601	Dust Covers , for Concord polycarbonate PCR plates, nonsealing, 25 covers

* Not recommended for use with ³⁵S.

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 barcode option

For More Information

Web: www.bio-rad.com/384wellpcrplates

Request or download bulletin: 5496

PCR Plastic Consumables

PCR Plates

www.bio-rad.com/pcrplastics

Ordering Information

Description	Clear Wells	White Wells	Black Wells
Hard-Shell 384-Well Standard PCR Plates			
Clear shell, 50 plates	HSP3801	HSP3805	—
White shell, 50 plates	HSP3851	—	—
Red shell, 50 plates	HSP3811	—	—
Yellow shell, 50 plates	HSP3821	—	—
Blue shell, 50 plates	HSP3831	—	—
Green shell, 50 plates	HSP3841	—	—
Black shell, 50 plates	—	HSP3865	HSP3866
Clear shell, barcoded, 50 plates	HSP3901	HSP3905	—
Clear shell, bulk pack of 500 plates	HSP3801B	—	—

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
- Barcoded at row A and column 24 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
HSR4805	Hard-Shell 384-Well 480 PCR Plates , clear shell/white well PCR plate for Roche LightCycler 480 real-time PCR system, barcoded, rigid 2-component design, 50 plates
HSR4805K	Hard-Shell 384-Well 480 PCR Plates Kit , for use with Roche LightCycler 480 real-time PCR system, includes 100 barcoded clear shell/white well PCR plates (2 packs of #HSR-4805) and 100 Microseal 'C' optical seals (#MSC-1001)
HSR4801	Hard-Shell 384-Well 480 PCR Plates , clear shell/clear well PCR plate for Roche LightCycler 480 real-time PCR system, barcoded, rigid 2-component design, 50 plates
HSR4801K	Hard-Shell 384-Well 480 PCR Plates Kit , for use with Roche LightCycler 480 real-time PCR system, includes 100 barcoded 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.

For More Information
Web: www.bio-rad.com/384wellplates

- Barcoded plates are available
- Footprint and well spacing that match ANSI/SBS standard dimensions

Ordering Information

Description	50 Plates	Barcoded, 50 Plates
Microseal 384-Well Skirted PCR Plates		
Clear	MSP3842	MSP3846
White	MSP3852	—
Black	MSP3862	—

PCR Seals

Effective sealing is essential for PCR and qPCR reactions. Besides cap strips (page 399), Bio-Rad offers many sealing options to fit your needs.

PCR Plate Seals

Microseal® 'C' Optical Seals

- Optically clear adhesive films designed for tight seals even with wells with raised rims
- Pressure-sensitive adhesive allows easy application during plate sealing
- Designed with superior optical properties for real-time PCR



Microseal 'B' Adhesive Seals, Optically Clear

- Strongest adhesive-based optically clear sealing option designed for real-time PCR plates
- Withstands multiple storage or transport temperatures (–40 to 110°C)



Microseal 'A' Film

- A nonoptical, nonadhesive sealing option for quick pressure-based sealing of plates
- Allows easy removal without the risk of aerosol formation, minimizing cross-contamination
- Convenient option for standard PCR needs



Microseal 'F' Foil

- Aluminum foil allows opaque sealing option for DNA sequencing (ABI 3700 DNA analyzer) and sample storage
- Acts as a barrier against evaporation in extreme temperatures (–80 to 105°C)
- Pierceable foil for easy sample retrieval



Microseal 'F' Foil

96-Well PCR Plate Sealing Mats

These reusable mats are convenient for sealing 96-well PCR plates; they are not suitable for qPCR.



96-Well PCR Plate Sealing Mat

Pressure Pad

This foam pad with magnet distributes lid pressure uniformly over sealing film on plates used in thermal cyclers.

Optical Compression Pad (96-well)

This compression pad enhances the seal integrity of Microseal 'B' clear seals when used in real-time PCR detection systems.

Optical Film Sealing Kit

The sealing kits contain 100 Microseal 'B' clear seals and an optical compression pad.



Sealing Roller

Optical Compression Pad

Ordering Information

Catalog #	Description
MSC1001	Microseal 'C' Optical Seals , 100 pressure-sensitive adhesive seals
MSA5001	Microseal 'A' Film , 50 seals
MSB1001	Microseal 'B' Adhesive Seals , 100 optically clear seals
MSF1001	Microseal 'F' Foil , 100 adhesive seals
MSR0001	Sealing Roller , for sealing PCR plates with films
ADR3296	Optical Compression Pad , for improved film sealing of 96-well plates in DNA Engine Opticon 2 and Chromo4 systems
ADR5001	Pressure Pad , uniformly distributes lid pressure for sealing film
MSO1001	Optical Film Sealing Kit , for 96-well plates, includes optical compression pad, 100 Microseal 'B' clear adhesive seals
2239442	96-Well PCR Plate Sealing Mats , 5

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

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

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™/QX200™ Droplet Digital™ PCR system workflow
- High solvent resistance
- Colored stripe clearly identifies sealing surface
- Seal integrity from –20 to 110°C

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



Optically Clear Heat Seal



Permanent Clear Heat Seal



Pierceable Foil Heat Seal



Peelable Foil Heat Seal

For More Information

Web: www.bio-rad.com/heatseals

Request or download bulletin: 6257

See Also

PX1 PCR plate sealer: page 396.

PCR plates: page 401.

Ordering Information

Catalog #	Description
1814030	Optically Clear Heat Seal , package of 100
1814035	Permanent Clear Heat Seal , package of 100
1814040	Pierceable Foil Heat Seal , package of 100
1814045	Peelable Foil Heat Seal , package 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.



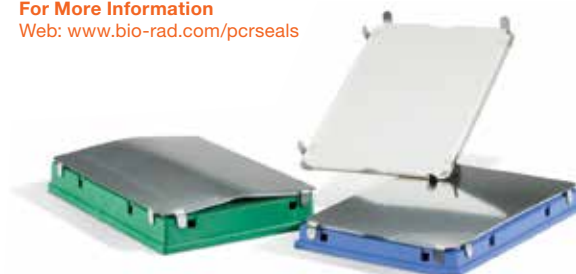
Microseal 'P+' Sealing Pad

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	
MSP1001	Microseal 'P' Pads , reusable, for Power Bonnet lids, 10
MSP1002	Microseal 'P+' Pads , reusable, for Moto Alpha unit lids, 10
MSP1003	Microseal 'P' Replacement Pads , for MSL-2032, reusable, 10

Auto-Sealing Lids for PCR Plates

MSL2012	Flat Auto-Sealing PCR Plate Lids , reusable, 4
MSL2022	Arched Auto-Sealing PCR Plate Lids , reusable, 4
MSL2032	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
CHO1401	Chill-out Liquid Wax , red, 100 ml
CHO1404	Chill-out Liquid Wax , red, 1 L
CHO1411	Chill-out Liquid Wax , clear, optical grade, 100 ml
CHO1414	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, colonies, 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
SLF0201	Frame-Seal Incubation Chambers , 9 x 9 mm, 25 µl capacity, coverslips included, 100
SLF0601	Frame-Seal Incubation Chambers , 15 x 15 mm, 65 µl capacity, coverslips included, 100
SLF1201	Frame-Seal Incubation Chambers , 17 x 28 mm, 125 µl capacity, coverslips included, 100
SLF3001	Frame-Seal Incubation Chambers , 19 x 60 mm, 300 µl capacity, coverslips included, 100

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Plastic Consumables and General Laboratory Equipment

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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 μ l.

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

These multichannel micropipets are ideal for use with standard 96-well formats. They have an adjustable working volume range of 5–50 μ l or 20–200 μ l. 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 360° 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 μ m filter.

For More Information

Web: www.bio-rad.com/micropipets



Professional Micropipets

Professional Micropipet Specifications

	Volume Range, μ l	Channels	Adjustable-Volume Increments, μ l
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, P50	5–50	8	0.2
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
1660499	Professional Micropipet , adjustable volume, 0.1–2.0 µl
1660505	Professional Micropipet , adjustable volume, 0.5–10 µl
1660506	Professional Micropipet , adjustable volume, 2–20 µl
1660507	Professional Micropipet , adjustable volume, 20–200 µl
1660508	Professional Micropipet , adjustable volume, 100–1,000 µl
1660496	Professional Micropipet , 8-channel, adjustable volume, 5–50 µl
1660495	Professional Micropipet , 8-channel, adjustable volume, 20–200 µl
1660486	Professional Micropipet 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
1660490	Professional Pipet Controller , 120 V, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 µm filter
1660491	Professional Pipet Controller , 220 V, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 µm filter
1660492	Professional Pipet Controller , 220 V for Australia, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 µm filter
1660487	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 clear 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

Micropipets, Tips, and Micro Test Tubes

Pipet Tips

www.bio-rad.com/pipettips

Tip Selection Guide

Pipet Type	Tip Type	Pipet Type	Tip Type
Bio-Rad Professional		Oxford Benchmate	
0.1–2.0 µl	Xcluda™ A, Seque/Pro™, BR-14, TBR-14	0.5–10 µl	Seque/Pro, Xcluda A, 14
0.5–10 µl	Xcluda A, Seque/Pro, BR-31, TBR-14	10–50 µl	Xcluda J, 35, 37–39
2–20 µl	Xcluda B, Prot/Elec™, BR-35, TBR-35	40–200 µl	Prot/Elec, Xcluda C, D, G, 35, 37–39
20–200 µl	Xcluda D, Prot/Elec, MTP-26, -35, -37, -38, MTP-28-S, BR-35, -37, -38, -39, TBR-35	200–1,000 µl	Xcluda E
100–1,000 µl	Xcluda H, BR-40, 41, TBR-40, -41	Rainin Pipetman and EDP Series	
Costar (8-Pette, 12-Pette)		0.1–10 µl	Seque/Pro, Xcluda F, 31
20–200 µl	28	2–20 µl	Prot/Elec, Seque/Pro, Xcluda B, 31, 35, 37–39
25–200 µl	28	10–100 µl	Prot/Elec, Xcluda C and G, 35, 37–39
Eppendorf		20–200 µl	Prot/Elec, Xcluda D, 35, 37–39
0.5–10 µl	Seque/Pro, Xcluda F, 31	100–1,000 µl	Xcluda E, 40, 41
2–20 µl	Prot/Elec, Xcluda B, 14, 35, 37–39	Socorex	
10–100 µl	Prot/Elec, Xcluda C and G, 35, 37–39	0.5–10 µl	Seque/Pro
50–250 µl	39, 40, 41	1–200 µl	Prot/Elec, 35, 37–39
100–1,000 µl	Xcluda H, 41	200–1,000 µl	40, 41
Excalibur		Titertek Flow	
1–200 µl	Prot/Elec, 35, 37–39	5–200 µl	26
200–1,000 µl	40, 41	5–300 µl	Xcluda D
Thermo Labsystems Finnpiptette		Volac	
5–40 µl	Prot/Elec, Xcluda B, C, G, 35, 37–39	1–20 µl	Prot/Elec, 31, 35, 37–39
40–200 µl	Prot/Elec, Xcluda C and G, 35, 37–39	1–200 µl	Prot/Elec, 35, 37–39
200–1,000 µl	Xcluda E	200–1,000 µl	40, 41

See Also

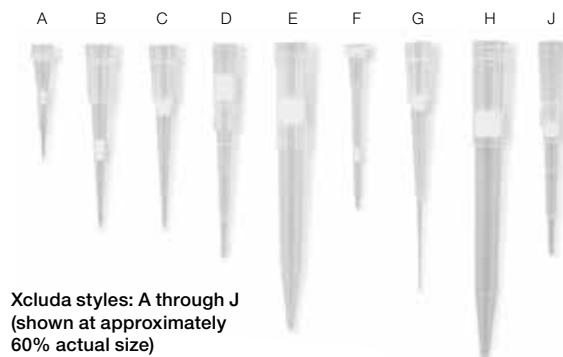
Thermal cyclers for PCR: page 367.
Real-time PCR systems: page 371.

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
2112001	Xcluda Style A , 0.5–10 µl, 960
2112006	Xcluda Style B , 2–20 µl, 960
2112011	Xcluda Style C , 10–100 µl, 960
2112016	Xcluda Style D , 20–200 µl, 960
2112021	Xcluda Style E , 100–1,000 µl, 960
2112026	Xcluda Style F , 0.5–10 µl, 1,000
2112031	Xcluda Style G , 10–100 µl, 1,000
2112036	Xcluda Style H , 100–1,000 µl, 1,000
2112041	Xcluda Style J , 10–100 µl, 960
1660491	Professional Pipet Controller , 220 V, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 µm filter
1660492	Professional Pipet Controller , 220 V for Australia, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 µm filter
1660487	Carousel Pipet Rack , holds 6 single-channel micropipets

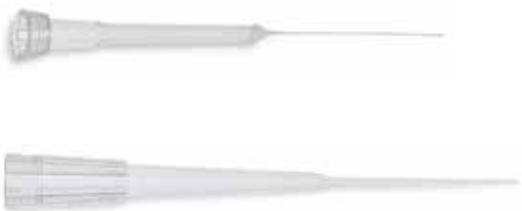
Pipet Tips for Gel Loading

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 micropipets (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 bulletin: 5676

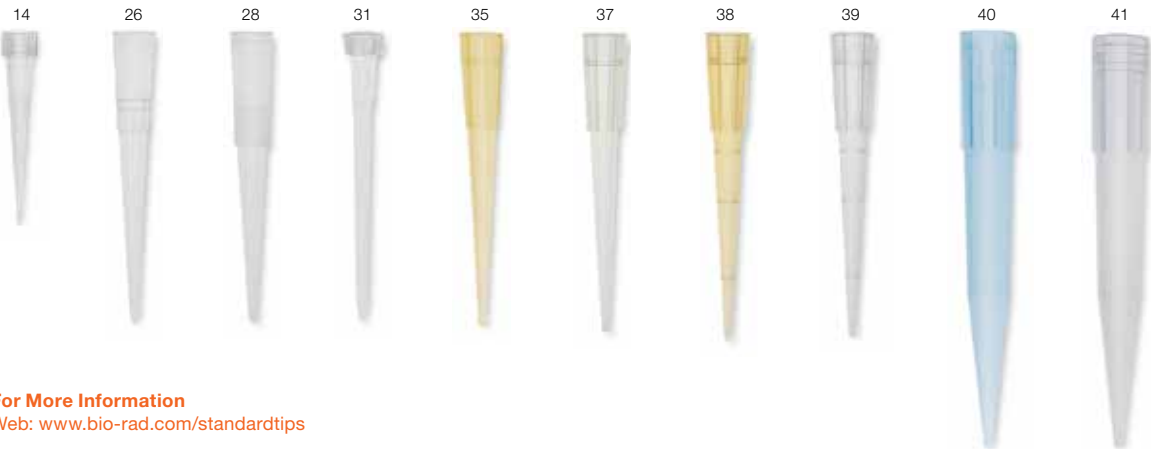
See Also

Vertical electrophoresis systems: page 176.

Ordering Information

Catalog #	Description
2239911	Seque/Pro Capillary Pipet Tips, in enclosed autoclavable rack, 0.5–10 µl, 200
2239912	Seque/Pro Capillary Pipet Tips, sterilized in enclosed rack, 0.5–10 µl, 200
2239915	Prot/Elec Pipet Tips, bulk pack, plastic bag in dust-free box, 1–200 µl, 1,000
2239917	Prot/Elec Pipet Tips, racked, 12 x 17 format, 204 per rack with a cover on each rack, 1–200 µl, 1,020
2239916	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 399

Tip Packaging Options

Packaging Option	Standard Tip Type Number									
	14	26	28	31	35	37	38	39	40	41
BR	•		•	•	•	•	•	•	•	•
RBR					•					
TBR	•				•				•	•
MTP		•			•	•	•			
MTP-S (sterilized)			•		•	•	•			

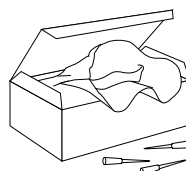
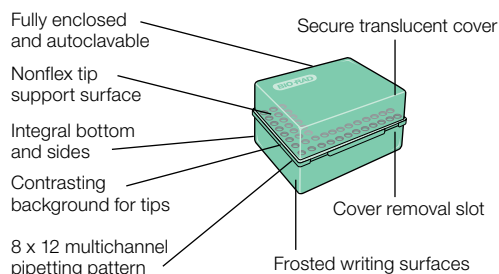
Micropipets, Tips, and Micro Test Tubes

Pipet Tips

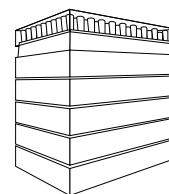
www.bio-rad.com/pipettips

MTP

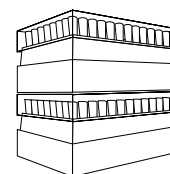
8 x 12 format, enclosed, nonflex racks are suitable for repeated reloading and autoclaving. Racked tips are also available presterilized.



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

2239301	MTP-26 Tips , clear, 5–200 µl, 960
2239303	MTP-35 Tips , yellow, 1–200 µl, 960
2239304	MTP-37 Tips , clear, 1–200 µl, 960
2239313	MTP-38 Tips , yellow, graduated, beveled, 1–200 µl, 960

MTP-S 8 x 12 Format, Enclosed Racks, Presterilized*

2239307	MTP-28-S Tips , clear, 25–200 µl, 960
2239308	MTP-35-S Tips , yellow, 1–200 µl, 960
2239309	MTP-37-S Tips , clear, 1–200 µl, 960
2239318	MTP-38-S Tips , yellow, graduated, beveled, 1–200 µl, 960

BR Bulk Tips

2239014	BR-14 Tips , clear, 0.1–10 µl, 1,000
2239028	BR-28 Tips , clear, 25–200 µl, 1,000
2239031	BR-31 Tips , clear, 0.5–10 µl, 1,000
2239035	BR-35 Tips , yellow, 1–200 µl, 1,000
2239037	BR-37 Tips , clear, 1–200 µl, 1,000
2239038	BR-38 Tips , yellow, graduated, beveled, 1–200 µl, 1,000
2239039	BR-39 Tips , clear, graduated, beveled, 1–200 µl, 1,000
2239040	BR-40 Tips , blue, 100–1,000 µl, 500
2239041	BR-41 Tips , clear, 100–1,000 µl, 500

RBR Racked Tips, One Cover on Nested Racks

2239135	RBR-35 Tips , yellow, 1–200 µl, 1,000
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TBR Racked Tips, Cover on Each Rack

2239354	TBR-14 Tips , clear, 0.1–10 µl, 1,000
2239347	TBR-35 Tips , yellow, 1–200 µl, 1,000
2239350	TBR-40 Tips , blue, 100–1,000 µl, 1,000
2239351	TBR-41 Tips , clear, 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/ft³
- Racks with a grid for identification of contents



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

Ordering Information

Catalog #	Description
2239390	Titertube Micro Test Tubes , unsterilized, 10 racks of 96 tubes
2239395*	Titertube Micro Test Tubes , presterilized, 10 racks of 96 tubes
2239391	Titertube Micro Test Tubes , unsterilized, bulk, 1,000
2239393	Titertube Plugs , unsterilized, 960 in 120 strips of 8
2239392*	Titertube Plugs , presterilized, 960 in 120 strips of 8
2239394	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



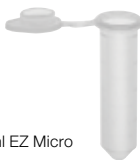
* 1.5 ml Colored Microcentrifuge Tubes are not autoclavable.



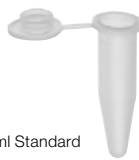
500 µl EZ Micro



1.5 ml EZ Micro



2 ml EZ Micro



1.5 ml Standard



1.5 ml Capless

Micropipets, Tips, and Micro Test Tubes

Reservoirs, EIA Plates, and Additional Plastic Products

www.bio-rad.com/microtesttube

Ordering Information

Catalog #	Description
2239503	EZ Micro Test Tubes , 500 µl, clear, 1,000
2239480	EZ Micro Test Tubes , 1.5 ml, clear, 500
2239430*	EZ Micro Test Tubes , 2 ml, clear, 500
2239501	Micro Test Tubes , standard, 1.5 ml, clear, 500
2239500	Micro Test Tubes , capless, 1.5 ml, polypropylene, clear, graduated, 500
2239490	Separate Caps , for capless micro test tubes, white, 1,000
1660473	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 excessive 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



Ordering Information

Catalog #	Description
2240165	0.5 ml Conical Tubes , with installed O-ring screwcaps, sterilized, 500
2240185	0.5 ml Skirted Tubes , with installed O-ring screwcaps, sterilized, 500
2240100	1.5 ml Conical Tubes , with separate O-ring screwcaps, unsterilized, 500
2240110	1.5 ml Conical Tubes , with installed O-ring screwcaps, sterilized, 500
2240130	2.0 ml Skirted Tubes , with separate O-ring screwcaps, unsterilized, 500
2240140	2.0 ml Skirted Tubes , with installed O-ring screwcaps, sterilized, 500

Reservoirs, EIA Plates, and Additional Plastic Products

See Also

PCR tubes:
page 399.

ELISA reagents:
page 342.

Microplate readers:
page 340.

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



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
2244872	Sterilized Reagent Reservoirs , graduated, polystyrene, 5 per package, box of 200
2240096	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.

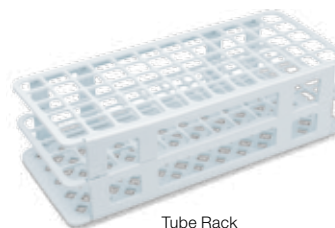
Racks and Storage Box Selection Guide

	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



Storage Boxes and Green Rack



Tube Rack

See Also

Cuvettes:
page 35.

Ordering Information

Catalog #	Description
1660481	Green Racks , hold 80 x 1.5/2.0 ml tubes, set of 5
1660483	Tube Racks , hold 60 x 15 ml tubes, set of 5
1660484	Tube Racks , hold 24 x 50 ml tubes, set of 5
1660482	Storage Boxes , hold 100 x 1.5/2.0 ml tubes, set of 5, multicolored

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** — disposable plastic 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 cap, 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
1660476	Cell Culture Tubes , 17 x 100 mm, 14 ml, sterile, 25
1660475	Conical Centrifuge Tubes , 15 ml, 50
1660470	Petri Dishes , 60 mm diameter, sterile, 500
1660471	Inoculation Loops , 10 µl, sterile, 80
1660474	Disposable Plastic Transfer Pipets , sterile, 1 ml, graduated, 500
1660480	Disposable Plastic Transfer Pipets , nonsterile, 1 ml, graduated, 500
1660477	Gel Staining Trays , 4
1660479	Jellyfish Foam Floating Racks , 8

General Laboratory Equipment

See Also

UView 6x
loading dye:
page 271.

UView™ Transilluminator

Visualize your gel using the compact UView transilluminator.

For More Information

Web: www.bio-rad.com/uview



Ordering Information

Catalog #	Description
1660531	UView Transilluminator

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
1660603	Mini Centrifuge , 120 V
1660613	Mini Centrifuge , 220 V
1660623	Mini Centrifuge , 220 V (UK)
1660602	Model 16K Microcentrifuge , 120 V
1660612	Model 16K Microcentrifuge , 220 V
1660620	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:
page 419.

PCR tubes:
page 397.

Ordering Information

Catalog #	Description
1660710	Mini Rocker , 120 V, includes two blotting boxes
1660720	Mini Rocker , 230 V (EU/UK), includes two blotting boxes
1660711	Tube Roller , 120 V, includes 3 tube carousels for 1.5, 15, and 50 ml tubes
1660721	Tube Roller , 230 V, includes 3 tube carousels for 1.5, 15, and 50 ml tubes
1660722	Tube Roller , 230 V (UK), includes 3 tube carousels for 1.5, 15, and 50 ml tubes
1660610	BR-2000 Vortexer , 120 V
1660611	BR-2000 Vortexer , 230 V
1660621	BR-2000 Vortexer , 230 V (UK)
1660622	Flathead Dimpled Adaptor , for BR-2000 vortexer
1660709	UltraRocker Rocking Platform , 120 V
1660719	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



Digital Dry Bath

0.5 ml
Dry Bath Block2.0 ml
Dry Bath Block

Mini Incubation Oven



Water Bath



DyNA Chill Cooler

For More Information

Web: www.bio-rad.com/tempcontrol

Ordering Information

Catalog #	Description
1660562	Digital Dry Bath , 120 V, includes 1.5 ml heating block
1660563	Digital Dry Bath , 230 V (EU/UK), includes 1.5 ml heating block
1660565	Digital Dry Bath Heating Block, 0.5 ml , for 24 x 0.5 ml tubes
1660566	Digital Dry Bath Heating Block, 2.0 ml , for 24 x 2.0 ml tubes
1660567	Digital Dry Bath Heating Block, 15 ml , for 12 x 15 ml tubes
1660564	DyNA Chill Cooler , maintains sample temperature between –15°C and room temperature for up to 8 hr without ice
1660501	Mini Incubation Oven , 120 V
1660521	Mini Incubation Oven , 230 V
1660504	Temperature-Controlled Water Bath , 120 V
1660524	Temperature-Controlled Water Bath , 230 V
1660712	Mini Incubation Oven and Mini Rocker , 120 V
1660713	Mini Incubation Oven and Tube Roller , 120 V

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Biotechnology Explorer™ Educational Products

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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 goals for Vision and Change in Undergraduate Biology Education. The program provides kits, a textbook, and modular lab series that bring research skills into the classroom. Meet the challenge to:

- Integrate core concepts and competencies throughout your 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 www.explorer.bio-rad.com.



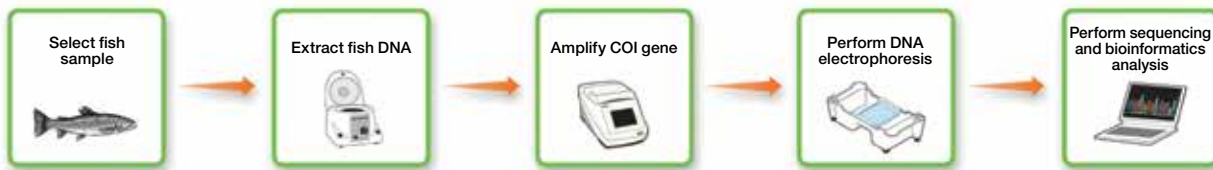
Fish DNA Barcoding Kit

What happens if one fish gets substituted for another? Most of the time, the consumer won't even notice. But what happens if substituting a less expensive fish for a more expensive one becomes a common practice? Or if a poisonous fish like pufferfish makes it into our food supply, or we deplete our oceans of critically endangered species? Bio-Rad's Fish DNA Barcoding kit helps students answer these and similar real-world questions,

contributing to the global species barcoding initiative while also learning advanced genetic analysis skills.

- Real-world application
- Inquiry-based hands-on laboratory
- Aligns with AP Biology Big Ideas 1, 2, 3, and 4

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



Fish DNA Barcoding Flowchart

Ordering Information

Catalog #	Description
1665100EDU	Fish DNA Barcoding Kit , includes reagents for DNA extraction and PCR for up to 16 fish samples. Purchase sequencing module (US only) separately.
1665115EDU	DNA Barcoding Sequencing Module , prepaid sequencing service for up to 9 samples. Includes shipping of samples. Valid only for use with 166-5100EDU. U.S. only.

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).

C. elegans Behavior Kit

Tired of fruit flies all over your classroom?

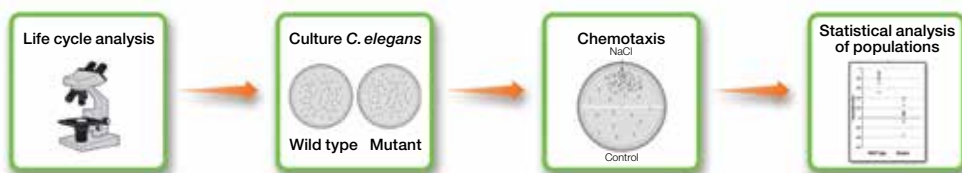
Caenorhabditis elegans is a much better behaved model organism that your students will love to study. Explore the fascinating life cycle of *C. elegans* through microscopic examination.

Did you know that *C. elegans* can learn? Compare a wild-type strain and a neurological mutant to see how a loss of the *daf-18* gene impacts learning capacity through a chemotaxis experiment. This offers a new and fascinating alternative to AP Biology Lab 12: Fruit Fly Behavior.

- Use a model organism
- Explore the life cycle of *C. elegans*
- Visualize chemotactic response to environment
- Demonstrate associative learning behavior
- Aligns with AP Biology Big Ideas 1, 2, 3, and 4

For More Information

Web: www.bio-rad.com/celegansbehaviorkit



C. elegans Behavior Kit Flowchart

Ordering Information

Catalog # Description

1665120EDU **C. elegans Behavior Kit**, includes reagents for *C. elegans* life cycle analysis and wild-type versus mutant behavior analysis. *C. elegans* is provided frozen and must be kept on dry ice (-70°C or colder) until ready to plate on NGM lite agar plates. *C. elegans* will be shipped separately on requested date.

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).

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: www.explorer.bio-rad.com/textbook

Ordering Information

Catalog #	Description
1661027EDU	Biotechnology: A Laboratory Skills Course , teacher edition, includes one student edition and one teacher supplement
1661025EDU	Biotechnology: A Laboratory Skills Course , student edition
1661026EDU	Biotechnology: A Laboratory Skills Course , teacher supplement
1661051EDU	Laboratory Notebook
1661052EDU	Supplementary Materials DVD Set

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 bio-rad.com/ad/college01 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*

1. Nucleic Acid Extraction
2. *GAPDH* PCR
3. Electrophoresis
4. PCR Kleen™ Spin Purification
5. Ligation and Transformation
6. Microbial Culturing
7. Auro™ Plasmid Mini Purification
8. Sequencing and Bioinformatics

* Available as a complete series or as individual modules.

Protein Expression and Purification Series*

1. Growth and Expression
2. SDS-PAGE Electrophoresis
3. Purification Process Options:
Centrifugation Purification
Hand-Packed Column Purification
Prepacked Cartridge Purification
4. DHFR Enzymatic Assay
5. Assessment

For More Information

Web: www.explorer.bio-rad.com/cloninglab

www.explorer.bio-rad.com/proteinpurification



Ordering Information

Catalog #	Description
1665000EDU*	Complete Cloning and Sequencing Explorer Series , includes all 8 modules and curriculum resource CD (sequencing service not included)
1665005EDU*	Nucleic Acid Extraction Module
1665010EDU*	GAPDH PCR Module
1660451EDU	Electrophoresis Module
7326300EDU	PCR Kleen Spin Purification Module
1665015EDU*	Ligation and Transformation Module
1665020EDU	Microbial Culturing Module
7326400EDU	Aurum Plasmid Mini Purification Module
1665025EDU*	Sequencing and Bioinformatics Module , includes sequencing primers, control plasmid, and bioinformatics subscription; sequencing service not included
1665001EDU	Curriculum Resource CD
1665040EDU*	Protein Expression and Purification Series , centrifugation purification process
1665045EDU*	Protein Expression and Purification Series , hand-packed purification process
1665050EDU*	Protein Expression and Purification Series , prepacked purification process
1665070EDU	Protein Expression and Purification Series Assessment Module , formative and summative assessment tool
1665055EDU*	Growth and Expression Module
1665060EDU*	SDS-PAGE Electrophoresis Module
1665041EDU	Centrifugation Purification Module
1665046EDU	Hand-Packed Purification Module
1665051EDU	Prepacked Purification Module
1665065EDU*	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™

V3 Western Workflow™ (stain-free rapid blotting)

Western Blotting in Less than 2 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™ transfer 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: www.explorer.bio-rad.com/rapidblotting

Hands-On Time Expenditure (in minutes)

	 Tank blotting	 Rapid blotting (staining required)	 V3 Western Workflow (stain-free rapid blotting)
Protein extraction and electrophoresis	33	33	33
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 (5 hrs 43 min to 7 hrs 43 min)	288 (4 hrs 48 min)	111 (1 hr 51 min)

Total Time Savings of 55 min to 7 1/2 hrs

Ordering Information

Catalog #	Description
-----------	-------------

1662875EDU	Rapid Blotting and V3 Western Workflow Starter Kit , comprehensive protein classroom study kit, includes protein profiler module (#1662700EDU), western blot module (#1662800EDU), Trans-Blot Turbo mini nitrocellulose transfer pack, TGX Stain-Free gels, application note, for 32 students
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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).

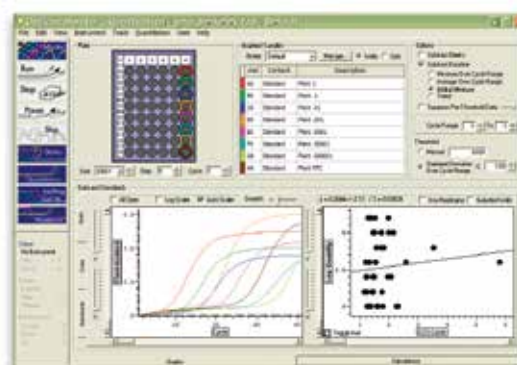
Real-Time PCR

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.



- Quantify 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: www.explorer.bio-rad.com/real-time

Ordering Information

Catalog #	Description
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1662660EDU	Crime Scene Investigator PCR Basics Real-Time PCR Starter Kit
1662560EDU	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.

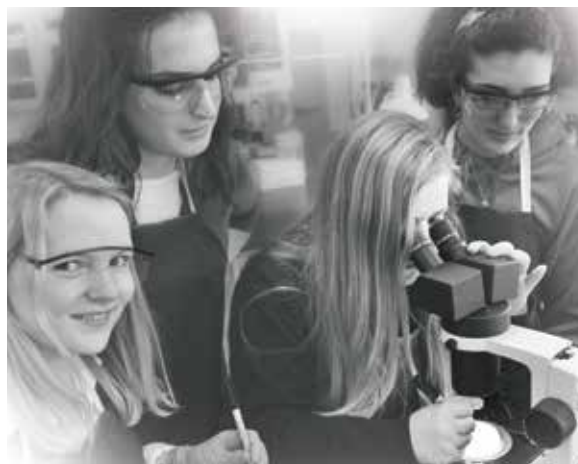
Classroom Kits

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



Ordering Information

Catalog #	Description
1665075EDU	IDEA Kit — Inquiry Dye Electrophoresis Activity , provides materials for 32 students or 8 workstations
1665080EDU	STEM Electrophoresis Teacher Demonstration Kit , provides materials for 8 students or 2 workstations
1665090EDU	STEM Electrophoresis Classroom Kit , provides materials for 32 students or 8 workstations
1660003EDU	pGLO Bacterial Transformation Kit , provides materials for 32 students or 8 workstations
1660013EDU*	pGLO Kit SDS-PAGE Extension , provides materials for 32 students or 8 workstations
1660005EDU*	Green Fluorescent Protein (GFP) Chromatography Kit , provides materials for 32 students or 8 workstations
1660006EDU*	Secrets of the Rainforest Kit , provides materials for 32 students or 8 workstations
1665030EDU	Microbes and Health Kit , provides materials for 32 students or 8 workstations
1660500EDU	Long-Wave UV Lamp , requires 4 AA batteries
1660530EDU	Long-Wave UV Penlight
1660008EDU	Size Exclusion Chromatography Kit , provides materials for 32 students or 8 workstations
1662900EDU*	Got Protein? Kit , provides materials for 320 students or 80 workstations
1662400EDU*	ELISA Immuno Explorer Kit , provides materials for 48 students or 12 workstations
1662700EDU*	Comparative Proteomics Kit I: Protein Profiler Module , provides materials for 32 students or 8 workstations
1662800EDU*	Comparative Proteomics Kit II: Western Blot Module , provides materials for 32 students or 8 workstations
1665035EDU*	Biofuel Enzyme Kit , provides materials for 32 students or 8 workstations
1660007EDU*	Forensic DNA Fingerprinting Kit , provides materials for 32 students or 8 workstations
1660001EDU*	Analysis of Precut Lambda DNA Kit , provides materials for 32 students or 8 workstations
1660002EDU*	Restriction Digestion and Analysis of Lambda DNA Kit , provides materials for 32 students or 8 workstations
1662300EDU	Genes in a Bottle Kit , includes 1 DNA extraction module (#1662000EDU) and DNA necklace module (#1662250EDU); provides materials for 36 students or 9 workstations
1662600EDU*	Crime Scene Investigator PCR Basics Kit , provides materials for 32 students or 8 workstations
1662100EDU*	PV92 PCR Informatics Kit , provides materials for 32 students or 8 workstations
1662500EDU*	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).

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Alpha™	DG8™	LP Data View™	QX100™
Aminex®	DG32™	Macro-Prep®	QX200™
AmpliSize®	Discover™	MainFrame™	RC DC™
AnyGel™	DNA Engine®	Micro Bio-Spin™	ReadiDrop™
Any kD™	DNA Engine Dyad®	Microplate Manager®	ReadyAgarose™
Aurum™	DNA Engine Opticon®	MicroPulser™	Ready Gel®
AutoDG™	DNA Engine Tetrad®	MicroRotor™	ReadyPrep™
AutoGimbal™	Dodeca™	Microseal®	ReadyStrip™
Bio-Beads™	Droplet Digital™	Mini-PROTEAN®	ReadySub-Cell™
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Bio-Plex Manager™	ELISA Immuno Explorer™	Nuvia™	ShockPod™
Bio-Plex Pro™	ENrich™	One-shot Kinetics™	siLentFect™
Bio-Rad®	EpiQ™	Opti-4CN™	Silver Stain Plus™
Bio-Rex™	Experion™	Opticon™	SingleShot™
Bio-Safe™	EXQuest™	Opticon Monitor™	SmartSpec™
Bio-Scale™	EZ Load™	Oriole™	SsoAdvanced™
Bio-Sil®	EZLogic™	PCR Kleen™	SsoFast™
Bio-Silect™	EZ Micro™	PDQuest™	Sub-Cell®
Bio-Spin®	Fast Blast™	PDS-1000/He™	SureBeads™
Biotechnology Explorer™	Flamingo™	Personal Molecular Imager™	T100™
C1000™	Foresight™	pGLO™	TC20™
C1000 Manager™	FPQuest™	PharosFX™	Tetrad®
C1000 Touch™	Frame-Seal™	PMI™	TGX™
Certified™	GelAir™	Point-to-Plumb™	TGX Stain-Free™
CFT™	Gel Doc™	Poly-Prep®	Tier Rotate™
CFX96 Touch™	Gene Pulser®	Power Bonnet™	Titertube®
CFX384 Touch™	Gene Pulser MXcell™	PowerPac™	Trans-Blot®
CFX Connect™	Gene Pulser Xcell™	Precision Melt Analysis™	Trans-Blot® Turbo™
CFX Manager™	GeneShot™	Precision Plus Protein™	TransFectin™
CFX96™	Genes in a Bottle™	Precision Pro™	trUView™
CFX384™	GMO Investigator™	PrecisionAb™	Ultramark™
Checkmark™	Got Protein?™	ProDrop™	UltraRocker™
CHEF-DR®	GS-900™	Profinia™	UNO®
CHEF Mapper®	Hard-Shell®	Profinity™	UNOsphere™
Chelex®	Helios®	Profinity eXact™	UNOsphere SUPRA™
ChemiDoc™	Hepta™	ProFlow™	UView™
Chill-out™	Hot Bonnet®	ProLine™	V3 Western Workflow™
CHT™	HydroTech™	PROTEAN®	Verification Probe™
ChromLab™	i12™	ProteinChip®	VersaDoc™
Chromo4™	iCycler®	Prot/Elec™	VersaFluor™
Clarity™	iCycler iQ®	ProteoMiner™	VivaFix™
CleanCut™	Image Lab™	ProteOn™	WesternC™
Concord™	iMark™	ProteOn Manager™	WinMelt™
C/P Lift®	Immun-Blot®	PulseTrac™	XcitaBlue™
cPrime™	Immunowash™	PureBind™	Xcluda™
Crime Scene Investigator	Immun-Star™	PureBlu™	xMark™
PCR Basics™	InPlace™	PureExtract™	x-Plex™
Criterion™	InstaGene™	PureZOL™	XPR™
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ÅKTA: GE Healthcare	Intel Core: Intel Corporation	QuickExtract: Epicentre
Alexa Fluor: Invitrogen Corporation	Internet Explorer: Microsoft Corporation	ReadiLink: AAT Bioquest
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