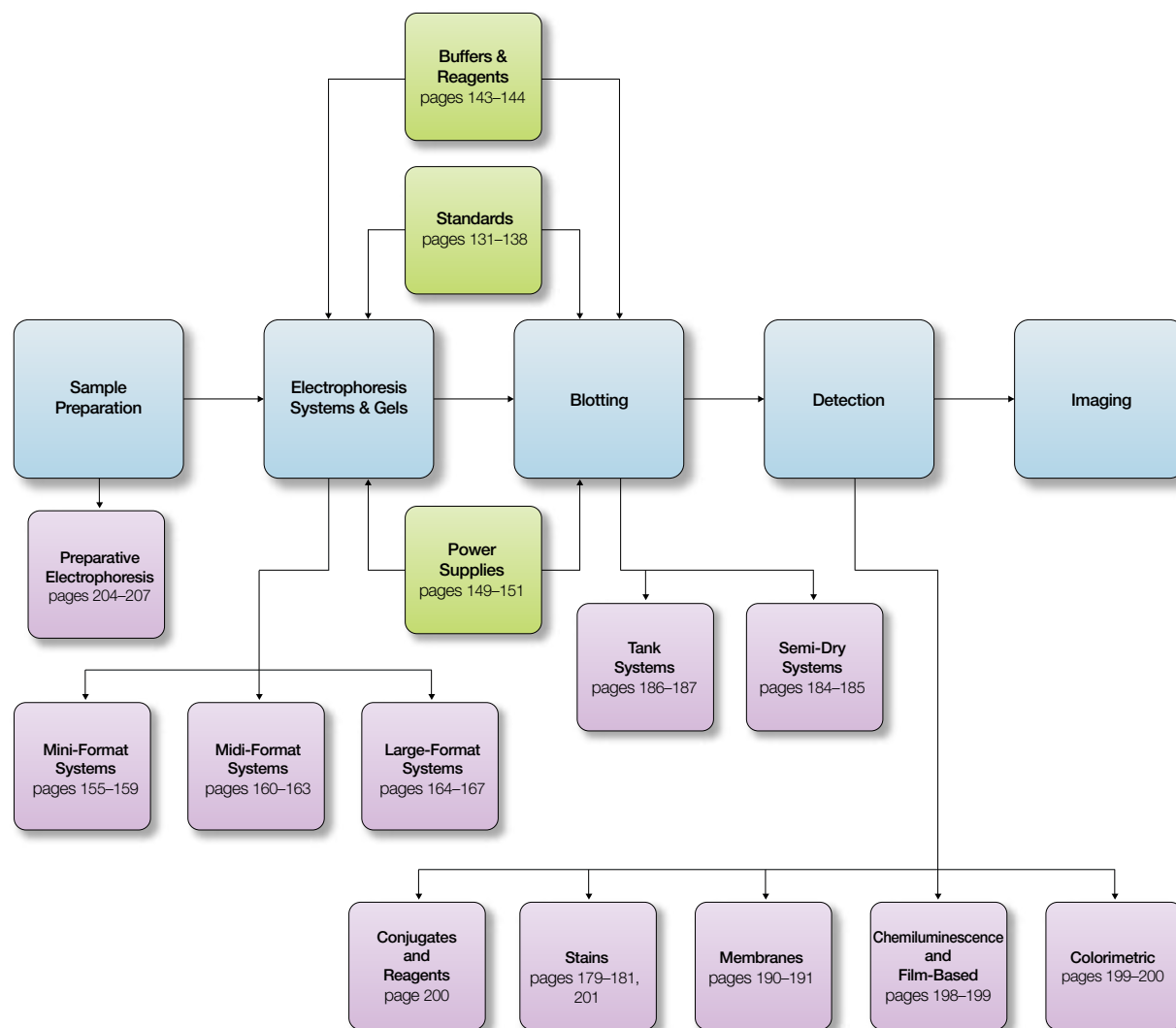


Electrophoresis and Blotting

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Electrophoresis and Blotting Solutions

Bio-Rad offers a complete solution for all of your electrophoresis and blotting needs — from sample preparation to imaging. Built on over 50 years of pioneering expertise, our innovative products offer reliable, reproducible results for all of your applications.



Protein 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 157 (Mini-PROTEAN® TGX™ gels), 158 (Ready Gel® gels), and 161–162 (Criterion™ gels).

For More Information

Request or download bulletins: 2414 and 2998

Protein Standards Selection Guide

| Type | Description | Application | Page |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Recombinant Prestained and Unstained Standards | | | |
| Precision Plus Protein™ Unstained standards | Highly purified recombinant proteins with integral <i>Strep</i> -tag technology for blot detection | 10–250 kD. MW determination on Coomassie- and silver-stained gels and blots; detection on blots using StrepTactin conjugates | 132 |
| Precision Plus Protein All Blue standards | Highly purified recombinant proteins covalently stained with a blue dye | 10–250kD. Assessing electrophoresis progress on gels; MW estimation on gels; monitoring transfer efficiency on blots. Standard can be detected in the red range for fluorescent blot applications | 132 |
| Precision Plus Protein Dual Color standards | Highly purified recombinant proteins covalently stained with a blue dye, plus two pink reference bands | 10–250 kD. Assessing electrophoresis progress on gels; MW estimation on gels; monitoring transfer efficiency on blots. Standard can be detected in the red and green ranges for fluorescent blot applications | 132 |
| Precision Plus Protein™ Kaleidoscope™ standards | Highly purified recombinant proteins covalently stained with dyes of five distinct colors | 10–250 kD. Assessing electrophoresis progress on gels; MW estimation on gels; monitoring transfer efficiency on blots. Standard can be detected in the red, blue, and green ranges for fluorescent blot applications | 132 |
| Precision Plus Protein™ WesternC™ standards | Highly purified recombinant proteins covalently prestained and designed with integral <i>Strep</i> -tag technology for blot detection | 10–250 kD. Assessing electrophoresis progress on gels; monitoring transfer efficiency on blots; visual MW estimation on gels and membrane, and MW determination on colorimetric or chemiluminescent developed blots. Standard can be detected in the red and green ranges for fluorescent blot applications | 132 |
| Precision Plus Protein Dual Xtra standards | Highly purified recombinant proteins covalently stained with blue dye, plus three pink reference bands | 2–250 kD. Assessing electrophoresis progress on gels; extra broad range MW estimation on gels; monitoring transfer efficiency on blots. Standard can be detected in the red and green ranges for fluorescent blot applications* | 132 |
| Precision Plus Protein standard plugs | Highly purified recombinant unstained proteins cast in 1 mm thick agarose plugs | 10–250 kD. MW estimation on 2-D gels | 133 |
| Natural Prestained Standards | | | |
| Kaleidoscope™ standards | Blend of naturally occurring proteins covalently stained with multicolored dyes | Assessing electrophoresis progress on gels; monitoring transfer efficiency on blots; MW estimation on gels | 134 |
| SDS-PAGE standards | Blend of naturally occurring proteins covalently stained with a blue dye | Assessing electrophoresis progress on gels; monitoring transfer efficiency on blots; MW estimation on gels | 135 |
| Natural Unstained Standards | | | |
| SDS-PAGE standards | Blend of naturally occurring unstained proteins | MW determination on Coomassie-stained or silver-stained gels | 136 |
| Specialty Standards | | | |
| IEF standards | Blend of native proteins of known pI values | pI calibration on analytical IEF gels | 136 |
| 2-D SDS-PAGE standards | Reduced and denatured proteins of known pI and MW | Control for 2-D electrophoresis | 136 |

* Dual Xtra standard recommended only for proteins >5 kD in fluorescence blots.

Recombinant Prestained and Unstained Standards

Precision Plus Protein™ standards for protein electrophoresis offer lot-to-lot consistency, a good balance between band sharpness and band brightness, accurate MW estimation, and excellent blotting results. These standards contain highly purified recombinant proteins.

See Also

Vertical electrophoresis systems: pages 153–167.
Horizontal electrophoresis systems: pages 211–217.
Electrophoresis and blotting buffers: pages 143–144.
Protein electrophoresis stains: pages 179–181.
Protein blotting stains: page 201.
Gel Doc EZ imaging system: page 234.
ChemiDoc MP imaging system: page 233.

Precision Plus Protein™ Standards

Order Info: Pg 139

Precision Plus Protein standards are available in Unstained, All Blue, Dual Color, Kaleidoscope™, WesternC™, and Dual Xtra options. Unstained, All Blue, Dual Color, Dual Xtra, and WesternC standards include three high-intensity reference bands (25, 50, and 75 kD). Features include:

- Clean, sharp bands for accurate MW estimation
- MW confirmed by mass spectrometry
- Proprietary staining technology that provides batch-to-batch MW consistency and reproducible electrophoretic migration
- Unstained and WesternC standards with a *Strep*-tag affinity sequence for detection and MW determination on western blots
- Natural fluorescence properties for multiplex fluorescent detection
- Precision Plus Unstained standards are an excellent choice for use with stain-free precast gels
- Dual Xtra standards have an expanded MW range for increased versatility

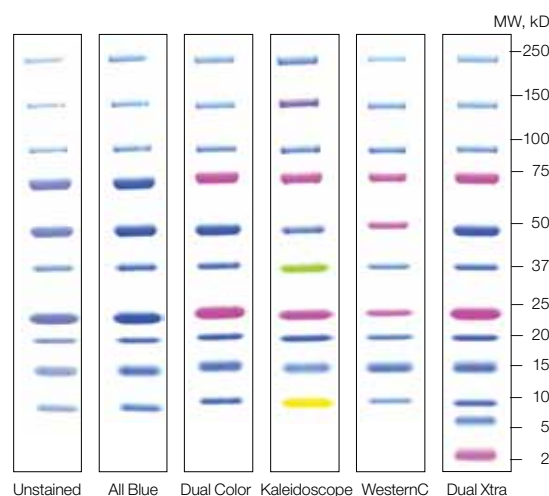
Precision Plus Protein™ WesternC™ Standards

Precision Plus Protein WesternC standards have ten prestained bands that enable chemiluminescence detection when probed with StrepTactin conjugates, so the protein standard appears on the gel, on the blot, and on film, or in a CCD image. The prestained bands allow monitoring of electrophoresis progression, assessment of transfer efficiency, and fluorescence detection, while the *Strep*-tag on each of the protein bands allows colorimetric or chemiluminescence detection. Benefits include:

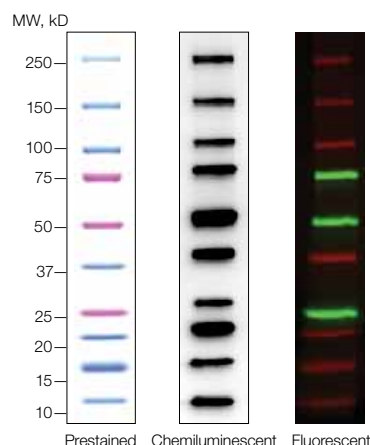
- Highly accurate MW estimation — R^2 values >0.99
- Dual-color prestained bands — three reference bands (25, 50, and 75 kD) prestained pink; all others prestained blue
- Clean, sharp, and accurate results
- *Strep*-tag present in all bands for chemiluminescence detection when used with StrepTactin-HRP or -AP
- Natural fluorescence properties for multiplex fluorescence detection
- Ready-to-use solution (no heating required)

For More Information

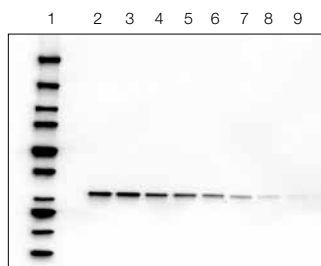
Request or download bulletins: 2847, 5561, 5575, and 5576; multiplex fluorescence detection — 5685 and 5723



The Precision Plus Protein standards family offers accurate and consistent protein standards for electrophoresis and western blotting experiments. All Precision Plus Protein standards generate a standard curve with R^2 values >0.99 from 10–250 kD, demonstrating a strong linear relationship between the proteins' log MW and relative migration distance on a gel. The product family includes Unstained and WesternC standards with a *Strep*-tag affinity peptide for detection and MW determination on western blots. The Dual Xtra standard provides an even wider MW range down to 2 kD.



Precision Plus Protein WesternC standards offer many detection options. Precision Plus Protein WesternC standards are prestained and can be used to monitor electrophoresis and western transfer. Each band contains a *Strep*-tag allowing chemiluminescent visualization of each band. The dyes used to stain the bands have natural fluorescent properties, making this standard ideal for fluorescence multiplexing.



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 ng, 150 ng, 100 ng, 75 ng, 50 ng, 25 ng, 12 ng, 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/proteinstandards

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

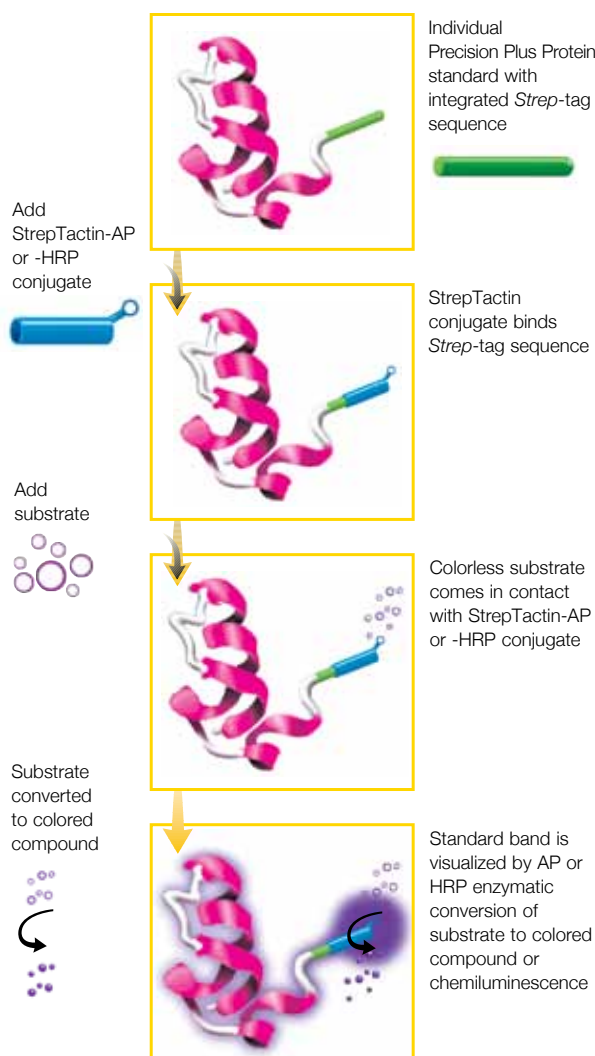
For More Information

Web: www.bio-rad.com/standardplugs



Precision Plus Protein Standard Plugs

Request or download bulletin: 3036



Overview of the StrepTactin detection system.

Precision Plus Protein Standards Specifications

| Product | Volume | Number of Applications | Loading Buffer | Shelf Life |
|-----------------|-----------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Unstained | 1 ml | 100 | 30% (w/v) glycerol, 2% SDS, 62.5 mM Tris, pH 6.8, 50 mM DTT, 5 mM EDTA, 0.02% NaN ₃ , 0.01% bromophenol blue (BPB) | 1 year at -20°C |
| All Blue | 500 µl | 50 | 30% (w/v) glycerol, 2% SDS, 62.5 mM Tris, pH 6.8, 50 mM DTT, 5 mM EDTA, 0.02% NaN ₃ , 0.01% BPB | 1 year at -20°C |
| Dual Color | 500 µl | 50 | 30% (w/v) glycerol, 2% SDS, 62.5 mM Tris, pH 6.8, 50 mM DTT, 5 mM EDTA, 0.02% NaN ₃ , 0.01% BPB | 1 year at -20°C |
| Kaleidoscope | 500 µl | 50 | 30% (w/v) glycerol, 2% SDS, 62.5 mM Tris, pH 6.8, 50 mM DTT, 5 mM EDTA, 0.02% NaN ₃ , 0.01% BPB | 1 year at -20°C |
| Dual Xtra | 500 µl | 50 | 30% (w/v) glycerol, 2% SDS, 62.5 mM Tris, pH 6.8, 50 mM DTT, 5 mM EDTA, 0.02% NaN ₃ , 0.01% BPB | 1 year at -20°C |
| WesternC | 250 µl | 50 | 30% (w/v) glycerol, 2% SDS, 62.5 mM Tris, pH 6.8, 50 mM DTT, 5 mM EDTA, 0.02% NaN ₃ , 0.01% BPB | 1 year at -20°C |
| WesternC pack* | 250 µl standard 125 µl HRP conjugate | 50 | 30% (w/v) glycerol, 2% SDS, 62.5 mM Tris, pH 6.8, 50 mM DTT, 5 mM EDTA, 0.02% NaN ₃ , 0.01% BPB | 1 year at -20°C |
| Unstained plugs | 24 plugs | 24 | 1% agarose, 128 mM glycine, 10% (w/v) glycerol, 0.7% SDS, 62.5 mM Tris, pH 8.3, 50 mM DTT, 5 mM EDTA, 0.02% NaN ₃ , 0.003% BPB | 3 months at 4°C (once opened) |

* WesternC pack comes with WesternC protein standard and StrepTactin-HRP conjugate, needed for colorimetric or chemiluminescent blot detection. StrepTactin-AP conjugate also available (catalog #161-0382).

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. Use Precision Plus Protein™ standards (see page 132) for more accurate MW determination and greater lot-to-lot consistency.

For More Information

Web: www.bio-rad.com/proteinstandards

Kaleidoscope™ Standards

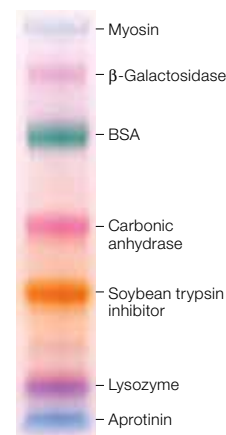
Order Info: Pg 139

Kaleidoscope standards have individually colored proteins to allow instant orientation on SDS-PAGE gels and western blots. Kaleidoscope prestained standards are broad range protein standards.

Calibrated MWs of Kaleidoscope Standards

| Protein | Color | MW Prestained |
|---------------------------|---------|---------------|
| Myosin | Blue | 216,000 |
| β-Galactosidase | Magenta | 132,000 |
| BSA | Green | 78,000 |
| Carbonic anhydrase | Violet | 45,700 |
| Soybean trypsin inhibitor | Orange | 32,500 |
| Lysozyme | Purple | 18,400 |
| Aprotinin | Blue | 7,600 |

MWs are of representative lots; actual weights may vary. Lot-specific MWs are included with each vial.



Kaleidoscope
Prestained
Standards

Prestained SDS-PAGE Standards

Order Info: Pg 139

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

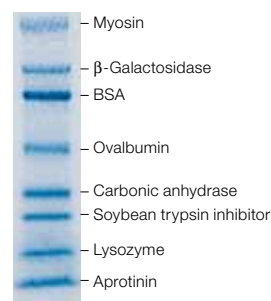
Calibrated MWs of Prestained SDS-PAGE Standards

| Protein | High Range | Low Range | Broad Range |
|---------------------------|------------|-----------|-------------|
| Myosin | 204,000 | — | 209,000 |
| β-Galactosidase | 123,000 | — | 124,000 |
| Phosphorylase b | — | 103,000 | — |
| BSA | 80,000 | 77,000 | 80,000 |
| Ovalbumin | 48,000 | 50,000 | 49,100 |
| Carbonic anhydrase | — | 34,300 | 34,800 |
| Soybean trypsin inhibitor | — | 28,800 | 28,900 |
| Lysozyme | — | 20,700 | 20,600 |
| 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 the efficiency of electrophoretic transfer 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.

**See Also**

Protein electrophoresis stains: pages 179–181.
Protein blotting stains: page 201.
Electrophoresis and blotting buffers: pages 143–144.
Gel Doc EZ imaging system: page 234.

Natural Unstained Standards

Unstained standards allow accurate MW determination on SDS-PAGE gels. Every batch is tested for proper mobility, providing a reliable control for gel-to-gel variability.

Specifications

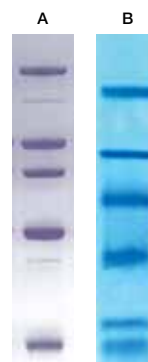
| | Volume, µl | Applications* (Number of Mini Gels) |
|-----------------------|------------|----------------------------------------|
| SDS-PAGE standards | 200 | 800–1,600 |
| Polypeptide standards | 200 | 800 |

* Number of applications depends on staining method.

For More Information

Web: www.bio-rad.com/proteinstandards

SDS-PAGE standards provide accurate MW determinations. A, high range SDS-PAGE standards stained with Coomassie Brilliant Blue R-250 stain; **B,** polypeptide SDS-PAGE standards stained with Coomassie Brilliant Blue G-250 stain.

**Constituent Proteins of Unstained SDS-PAGE Standards**

| Protein | MW, Da | Type of Standard | | | |
|---------------------------------------------------|---------|------------------|-----------|------------|-------------|
| | | Polypeptide | Low Range | High Range | Broad Range |
| Myosin (Woods et al. 1963) | 200,000 | | | • | • |
| β-Galactosidase (Fowler and Zabin 1977) | 116,250 | | | • | • |
| Phosphorylase b (Titani et al. 1977) | 97,400 | | • | • | • |
| BSA (Brown 1975) | 66,200 | | • | • | • |
| Ovalbumin (Warner 1954) | 45,000 | | • | • | • |
| Carbonic anhydrase (Davis 1961) | 31,000 | | • | | • |
| Triosephosphate isomerase (Corran and Waley 1974) | 26,625 | • | | | |
| Trypsin inhibitor (Wu and Scheraga 1962) | 21,500 | | • | | • |
| Myoglobin (Black and Leaf 1965) | 16,950 | • | | | |
| α-Lactalbumin (Brew et al. 1967) | 14,437 | • | | | |
| Lysozyme (Jolles 1969) | 14,400 | | • | | • |
| Aprotinin (Kassell and Laskowski 1965) | 6,500 | • | | | • |
| Insulin chain B, oxidized (Porter 1953) | 3,496 | • | | | |
| Bacitracin (Merck Index 1989) | 1,423 | • | | | |

See Also

Vertical electrophoresis systems: pages 153–167.
Electrophoresis and blotting buffers: pages 143–144.
Protein electrophoresis stains: pages 179–181.
Protein blotting stains: page 201.

Unstained SDS-PAGE Standards

Order Info: Pg 139

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 high, low, and broad molecular weight ranges, allowing calibration in almost any percentage gel. These standards can also be used when silver staining.

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.

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

IEF Standards

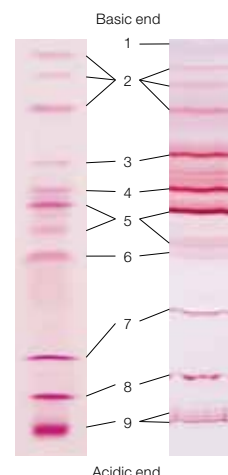
Order Info: Pg 139

IEF standards allow dependable and reproducible pI calibration in native polyacrylamide or agarose IEF gels. They are a mixture of nine native proteins with pIs ranging from 4.45 to 9.6. Five of the nine proteins are naturally colored. The standards are provided in a ready-to-use aqueous solution.

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).

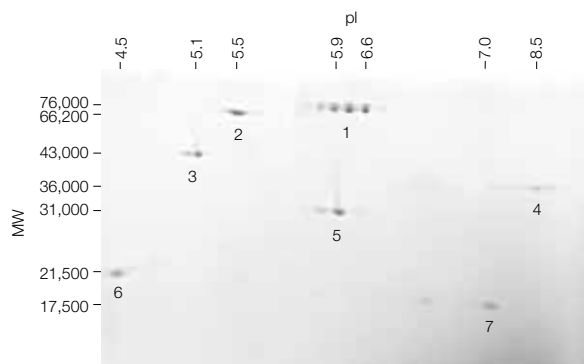
2-D SDS-PAGE Standards

Order Info: Pg 139

These unique protein standards provide calibrated references for the pI and MW of proteins in 2-D SDS-PAGE applications. They consist of seven reduced, denatured proteins that can be visualized with silver or Coomassie Blue stains. No dilution is required.

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. The standards separated on 7 cm ReadyStrip™ IPG strips were run in the Mini-PROTEAN® II cell.

Nucleic Acid Standards

Bio-Rad offers a broad variety of nucleic acid standards for conventional and pulsed field nucleic acid electrophoresis, including molecular rulers with evenly spaced banding patterns, EZ Load™ standards premixed with loading buffer, and specialty standards such as pulsed field standards.

Nucleic Acid Standards Selection Guide

| Type | Description |
|--------------------------------------------|-------------------------------------------------------------------------------|
| Molecular Rulers (see below) | |
| Standard and EZ Load molecular rulers | DNA standards 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 (page 138) | |
| Standard and EZ Load molecular mass rulers | Multiple bands of defined mass ranging from 10 to 100 ng for DNA quantitation |
| Pulsed Field Standards (page 138) | |
| 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 λ | 25 µg in 125 µl | 125 |
| Lambda (λ) ladder | 0.05–1 Mb | Concatemers of phage λcl857Sam7 | 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 |

Molecular Rulers

Order Info: Pg 140

Molecular rulers are DNA standards 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 standard 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

Molecular Rulers Selection Guide

| Ruler | Concentration | Range | Number of Bands | Reference Band | Amount | Suggested Gel Type | Number of Applications |
|--------------------|------------------------------|--------------|-------------------------|-----------------------|-----------|--------------------|------------------------|
| 20 bp | 0.2 µg/µl | 20–1,000 bp | 50 in 20 bp increments | 200 bp | 50 µg DNA | 2.5–4% agarose | 100 |
| EZ Load 20 bp | 0.1 µg/µl | | | | | | |
| 100 bp | 0.1 µg/µl | 100–1,000 bp | 10 in 100 bp increments | None | 25 µg DNA | 2.5–4% agarose | 100 |
| EZ Load 100 bp | 0.05 µg/µl | | | | | | |
| 100 bp PCR | 0.2 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 |
| EZ Load 100 bp PCR | 0.08 µg/µl | | | | | | |
| 500 bp | 0.2 µg/µl | 500–8,000 bp | 16 in 500 bp increments | 5,000 bp | 40 µg DNA | 0.8–1% agarose | 100 |
| EZ Load 500 bp | 0.08 µg/µl | | | | | | |
| 1 kb | 0.2 µg/µl | 1–15 kb | 15 in 1 kb increments | 5 kb | 40 µg DNA | 0.8–1% agarose | 100 |
| EZ Load 1 kb | 0.08 µg/µl | | | | | | |
| 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 to 100 ng | None | 25 µg DNA | 1–3% agarose | 100 |
| EZ Load precision | 0.05 µg/µl | 100–1,000 bp | 5, from 10 to 100 ng | None | 25 µg DNA | 1–3% agarose | 100 |

See Also

Pipet tips:
pages 331–333.

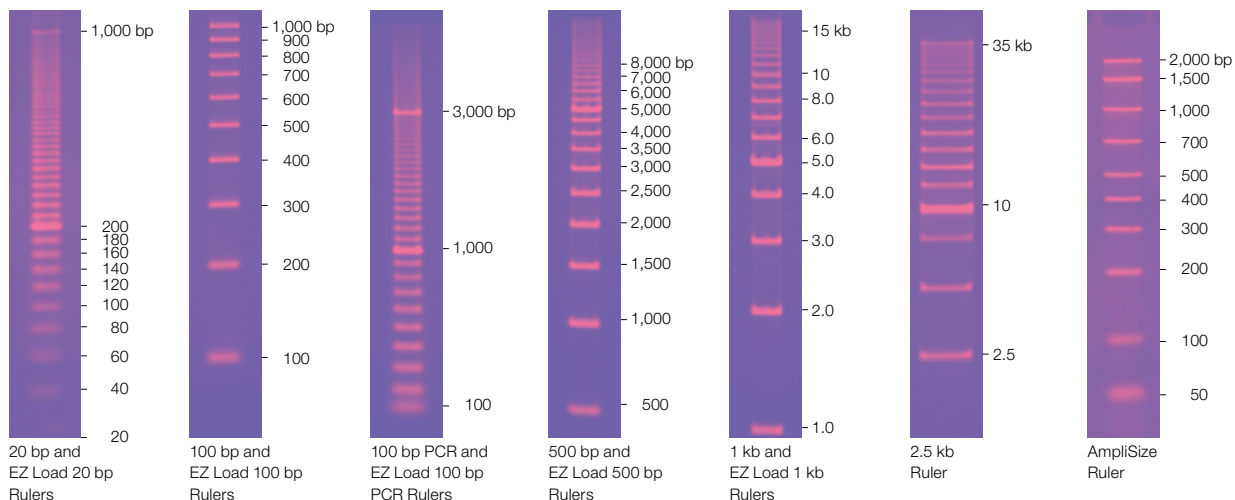
Micro test tubes:
pages 334–335.

Freeze 'N Squeeze
DNA gel extraction
spin columns:
page 6.

ReadyAgarose
precast gels:
page 217.

Imaging systems:
pages 232–237.

Horizontal
electrophoresis
systems:
pages 211–217.

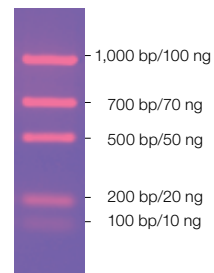


Molecular Mass Rulers

Order Info: Pg 140

Bio-Rad's precision molecular mass rulers allow accurate DNA quantitation in gels, making them ideal for densitometry or image analysis. These standards 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.

Precision, EZ Load
Precision Mass Rulers



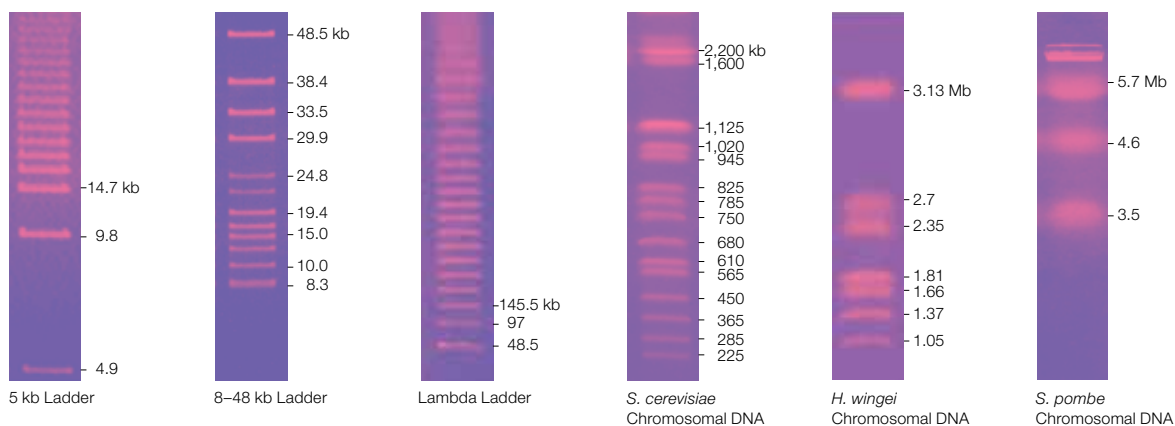
See Also

CHEF genomic DNA plug kits: page 220.
Pulsed field gel electrophoresis systems: pages 218–220.
Imaging systems: pages 232–237.
Bioinformatics software: pages 242–245.
Certified agaroses: page 142.

Pulsed Field Standards

Order Info: Pg 140

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.



Protein Standards

Recombinant Prestained and Unstained Standards

Catalog # Description

| Precision Plus Protein Standards | | Pg 132 |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------|
| 161-0363 | Precision Plus Protein Unstained Standards, 1 ml, 100 applications | |
| 161-0396 | Precision Plus Protein Unstained Standards Value Pack, 5 x 1 ml, 500 applications | |
| 161-0373 | Precision Plus Protein All Blue Standards, 500 µl, 50 applications | |
| 161-0393 | Precision Plus Protein All Blue Standards Value Pack, 5 x 500 µl, 250 applications | |
| 161-0374 | Precision Plus Protein Dual Color Standards, 500 µl, 50 applications | |
| 161-0394 | Precision Plus Protein Dual Color Standards Value Pack, 5 x 500 µl, 250 applications | |
| 161-0375 | Precision Plus Protein Kaleidoscope Standards, 500 µl, 50 applications | |
| 161-0395 | Precision Plus Protein Kaleidoscope Standards Value Pack, 5 x 500 µl, 250 applications | |
| 161-0385* | Precision Plus Protein WesternC Pack, 250 µl WesternC standard, 125 µl HRP conjugate, 50 applications | |
| 161-0398* | Precision Plus Protein WesternC Pack, HRP Value Pack, 5 x 250 µl WesternC standard, 5 x 125 µl HRP conjugate, 250 applications | |
| 161-0376* | Precision Plus Protein WesternC Standards, 250 µl, 50 applications | |
| 161-0399* | Precision Plus Protein WesternC Standards Value Pack, 5 x 250 µl, 250 applications | |
| 161-0377 | Precision Plus Protein Dual Xtra Standards, 500 µl, 50 applications | |
| 161-0397 | Precision Plus Protein Dual Xtra Standards Value Pack, 5 x 500 µl, 250 applications | |
| StrepTactin Conjugates for Precision Plus Protein Standards | | |
| 161-0380 | Precision Protein StrepTactin-HRP Conjugate, 300 µl, 150 applications | |
| 161-0381 | Precision Protein StrepTactin-HRP Conjugate, 125 µl, 50 applications | |
| 161-0382 | Precision Protein StrepTactin-AP Conjugate, 300 µl, 150 applications | |
| Precision Plus Protein Standard Plugs | | |
| 161-0378 | Precision Plus Protein Standard Plugs, unstained, 24 applications | |
| Immun-Star WesternC Chemiluminescent Kit | | |
| 170-5070 | Immun-Star WesternC Chemiluminescent Kit, 100 ml (50 ml of luminol/enhancer, 50 ml of stable peroxide solution) | |

Note that StrepTactin (-HRP or -AP) conjugate is needed for colorimetric or chemiluminescence blots.

Natural Prestained Standards

| Kaleidoscope Standards | | Pg 134 |
|------------------------------------------------------------------------------|--------------------------------------------------------|--------|
| 161-0324 | Kaleidoscope Prestained Standards, broad range, 500 µl | |
| Standards have a shelf life of 1 year at -20°C; shipped at room temperature. | | |
| Prestained SDS-PAGE Standards | | Pg 135 |
| 161-0309 | Prestained SDS-PAGE Standards, high range, 500 µl | |
| 161-0305 | Prestained SDS-PAGE Standards, low range, 500 µl | |
| 161-0318 | Prestained SDS-PAGE Standards, broad range, 500 µl | |
| Standards have a shelf life of 1 year at -20°C; shipped at room temperature. | | |

Natural Unstained Standards

| Unstained SDS-PAGE Standards | | Pg 136 |
|------------------------------|-----------------------------------------|--------|
| 161-0303 | SDS-PAGE Standards, high range, 200 µl | |
| 161-0304 | SDS-PAGE Standards, low range, 200 µl | |
| 161-0317 | SDS-PAGE Standards, broad range, 200 µl | |
| 161-0326 | Polypeptide SDS-PAGE Standards, 200 µl | |

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

| IEF Standards | | Pg 136 |
|------------------------|--------------------------------|--------|
| 161-0310 | IEF Standards, 250 µl | |
| 2-D SDS-PAGE Standards | | Pg 136 |
| 161-0320 | 2-D SDS-PAGE Standards, 500 µl | |

Nucleic Acid Standards

Catalog # Description

Molecular Rulers

Pg 137

20 bp Molecular Rulers

- 170-8201 **20 bp Molecular Ruler**, 250 µl, 20–1,000 bp, 100 applications
 170-8351 **EZ Load 20 bp Molecular Ruler**, 500 µl, 20–1,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications

100 bp Molecular Rulers

- 170-8202 **100 bp Molecular Ruler**, 250 µl, 100–1,000 bp, 100 applications
 170-8352 **EZ Load 100 bp Molecular Ruler**, 500 µl, 100–1,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications
 170-8206 **100 bp PCR Molecular Ruler**, 200 µl, 100–3,000 bp, 100 applications
 170-8353 **EZ Load 100 bp PCR Molecular Ruler**, 500 µl, 100–3,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications

500 bp Molecular Rulers

- 170-8203 **500 bp Molecular Ruler**, 200 µl, 500–8,000 bp, 100 applications
 170-8354 **EZ Load 500 bp Molecular Ruler**, 500 µl, 500–8,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications

1 kb Molecular Rulers

- 170-8204 **1 kb Molecular Ruler**, 200 µl, 1–15 kb, 100 applications
 170-8355 **EZ Load 1 kb Molecular Ruler**, 500 µl, 1–15 kb, includes 1 ml 5x nucleic acid sample buffer, 100 applications

2.5 kb Molecular Ruler

- 170-8205 **2.5 kb Molecular Ruler**, 400 µl, 2.5–35 kb, 100 applications

AmpliSize Molecular Ruler

- 170-8200 **AmpliSize Molecular Ruler**, 250 µl, 50–2,000 bp, 50 applications

Molecular Mass Rulers

Pg 138

- 170-8207 **Precision Molecular Mass Ruler**, 250 µl, 100–1,000 bp, 10–100 ng, 100 applications
 170-8356 **EZ Load Precision Molecular Mass Ruler**, 500 µl, 100–1,000 bp, 10–100 ng, 100 applications

Pulsed Field Standards

Pg 138

Pulsed Field Standards*

- 170-3624 **CHEF DNA Size Standard**, 5 kb ladder, 4.9–120 kb, 20–25 lanes
 170-3707 **CHEF DNA Size Standard**, 8–48 kb, 125 lanes
 170-3635 **CHEF DNA Size Standard**, lambda ladder, 0.05–1 Mb, 5 agarose blocks, sufficient for 25–40 plugs

Pulsed Field Markers*

- 170-3605 **CHEF DNA Size Marker**, *S. cerevisiae*, 0.2–2.2 Mb, 5 agarose blocks, sufficient for 25–40 plugs
 170-3667 **CHEF DNA Size Marker**, *H. wingei*, 1–3.1 Mb, 5 agarose blocks, sufficient for 25–40 plugs
 170-3633 **CHEF DNA Size Marker**, *S. pombe*, 3.5–5.7 Mb, 5 agarose blocks, sufficient for 25–40 plugs

* CHEF, clamped homogeneous electrical field. For more information, see pages 218–220.

Gel-Casting Reagents

Acrylamide

Order Info: Pg 146

- **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 to 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 crosslinker (%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 the molecule of interest. For help in determining the best %T

Acrylamide/Crosslinker 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 |

and %C for your application, refer to the Precast Gels section on page 154. Examples of migration patterns of proteins on gels of different compositions can be found on page 157 (Mini-PROTEAN® TGX™ precast gels) and 161–162 (Criterion™ precast gels), or contact Bio-Rad Technical Support.

For More Information

Web: www.bio-rad.com/proteinreagents

Request or download bulletins: 1156 and 1866

Crosslinkers and Catalysts

Order Info: Pg 146

Bio-Rad offers standard and alternative crosslinkers for a variety of applications.

Cross-linker Application Guide

| | Formal Name | Chemical Structure | Applications |
|------|-------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bis | N,N'-methylene-bis-acrylamide | | General crosslinker 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 |

See Also

Horizontal electrophoresis: page 211–217.
 Overlay agarose: page 123.
 CleanCut agarose: page 220.
 CHEF genomic DNA plug kits: page 220.
 Buffers: pages 143–144.

Certified™ Agaroses

Order Info: Pg 146

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, unlike GQT products with similar sieving properties that gel at higher temperatures, gels at 40°C, so it is faster and easier to prepare.

Certified low range ultra agarose — This agarose provides superior resolution of small PCR fragments and primers. A 3% gel clearly resolves a 10 bp ladder, and a 4% gel approaches the resolution of an 8% polyacrylamide gel.

Certified low-melt agarose — This low melting temperature agarose has a high resolving capacity for DNA fragments ≥1,000 kb. It is recommended for preparative electrophoresis and for in-gel applications

such as digestion and ligation. It is also recommended for embedding chromosomes and megabase-sized DNA for pulsed field applications.

Certified PCR low-melt agarose — This agarose yields excellent resolution of fragments ≤1,000 bp in an analytical or preparative format. It is ideal for digestion by agarase and for all in-gel applications.

Certified megabase agarose — This Certified agarose is the superior choice for CHEF and FIGE applications. The gels are easy to handle even at concentrations as low as 0.3%. The separation range is between 1 kb and 5 Mb. Low background staining also provides superior imaging of high MW DNA.

Pulsed field Certified agarose — This agarose enables excellent separation and resolution of large DNA fragments in pulsed field gel applications. The optimal separation range is 1 kb–2 Mb. Running conditions for this agarose are a preset selectable method of the CHEF Mapper® XA system auto-algorithm.

For More Information

Web: www.bio-rad.com/nareagents

Request or download bulletin: 2755

IEP/IEF Agaroses

Order Info: Pg 147

Standard low $-m_r$ agarose — With its high strength, clarity, and low $-m_r$ value, this agarose is recommended for all standard immunoelectrophoresis applications.

High $-m_r$ agarose — The $-m_r$ value of ≥0.25 makes this gel suitable for counterimmunoelectrophoresis and to blend with standard low $-m_r$ agarose to increase its $-m_r$ for special applications.

Zero $-m_r$ agarose — This agarose is specific for IEF. It has no detectable electroendosmosis and is recommended for IEF of very high MW proteins or complexes that are subject to varying degrees of molecular sieving in polyacrylamide gels. Agarose IEF and post-run processing can be completed more quickly than polyacrylamide gel IEF.

For More Information

Web: www.bio-rad.com/nareagents

Premixed Buffers and Buffer Reagents

Premixed Sample Loading Buffers

Order Info: Pg 147

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 |
|----------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------|
| Laemmli sample buffer | 62.5 mM Tris-HCl, pH 6.8, 2% SDS, 25% glycerol, 0.01% bromophenol blue (BPB) | SDS-PAGE |
| Native sample buffer | 62.5 mM Tris-HCl, pH 6.8, 40% glycerol, 0.01% BPB | Native PAGE |
| Tricine sample buffer | 200 mM Tris-HCl, pH 6.8, 2% SDS, 40% glycerol, 0.04% Coomassie Brilliant Blue G-250 | Peptide and small protein SDS-PAGE |
| 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 |
| IEF sample buffer | 50% glycerol | IEF |
| Zymogram sample buffer | 62.5 mM Tris-HCl, pH 6.8, 4% SDS, 25% glycerol, 0.01% BPB | Protease analysis |
| 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 |

See Also

ReadyPrep 2-D sample preparation kits: page 9.

ReadyStrip IPG strips: page 122.

Premixed Gel-Casting Buffers

Order Info: Pg 147

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.

Premixed Running Buffers

Order Info: Pg 147

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 162.



See Also

ReadyStrip IPG strips: page 122.

Vertical electrophoresis: pages 153–167.

Horizontal electrophoresis: pages 211–217.

Premixed Buffers and Buffer Reagents

www.bio-rad.com/proteinreagents or www.bio-rad.com/nareagents

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 |

Premixed Blotting Buffers and Buffer Reagents

Order Info: Pg 147

Three transfer buffers are available: 10x Tris/glycine, 10x Tris/CAPS, 20x SSC. 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 also 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 |
| 20x SSC | 150 mM NaCl, 15 mM sodium citrate, pH 7.0 | Capillary transfer of agarose gels |
| 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) |
| 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.

Accessory Reagents

Tracking Dyes

Order Info: Pg 148

Bio-Rad offers two tracking dyes to monitor electrophoresis runs:

- Bromophenol blue for monitoring protein electrophoresis
- Xylene cyanole (FF) for monitoring nucleic acid electrophoresis

Detergents

Order Info: Pg 148

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.

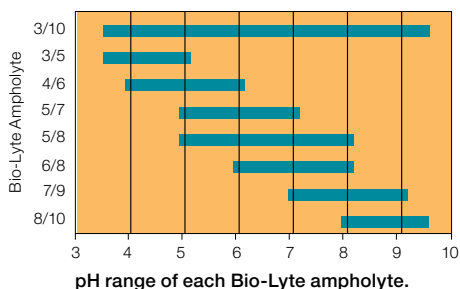
See Also

ReadyPrep
2-D sample
preparation kits:
page 9.

Bio-Lyte® Ampholytes

Order Info: Pg 148

Bio-Lyte carrier ampholytes, supplied as clear 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 to 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 122).



See Also

ReadyStrip IPG
strips: page 122.
Rotofor, mini Rotofor,
and MicroRotofor
preparative IEF cells:
pages 204–205.

Cleaning Concentrate

Order Info: Pg 148

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.

Gel Drying Solution

Order Info: Pg 148

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.

See Also

Gel drying systems:
pages 225–226.

Gel-Casting Reagents

Acrylamide

Pg 141

| Acrylamide Solutions* | 500 ml | 2 x 500 ml |
|----------------------------|----------|------------|
| 30% acrylamide/bis, 19:1 | 161-0154 | 161-0155 |
| 30% acrylamide/bis, 29:1 | 161-0156 | 161-0157 |
| 30% acrylamide/bis, 37.5:1 | 161-0158 | 161-0159 |
| 40% acrylamide/bis, 19:1 | 161-0144 | 161-0145 |
| 40% acrylamide/bis, 29:1 | 161-0146 | 161-0147 |
| 40% acrylamide/bis, 37.5:1 | 161-0148 | 161-0149 |
| 40% acrylamide | 161-0140 | 161-0141 |
| 2% bis solution | 161-0142 | 161-0143 |

Catalog # Description

Acrylamide Powder

| | |
|----------|--------------------------|
| 161-0100 | Acrylamide, 99.9%, 100 g |
| 161-0101 | Acrylamide, 99.9%, 500 g |
| 161-0107 | Acrylamide, 99.9%, 1 kg |
| 161-0103 | Acrylamide, 99.9%, 2 kg |
| 161-0108 | Acrylamide, 99.9%, 5 kg |

| Premixed Acrylamide/Bis Powders | 30 g | 150 g |
|---------------------------------|----------|----------|
| Acrylamide/bis, 19:1 | 161-0120 | 161-0123 |
| Acrylamide/bis, 29:1 | 161-0121 | 161-0124 |
| Acrylamide/bis, 37.5:1 | 161-0122 | 161-0125 |

Catalog # Description

Premixed Gel-Casting Buffers

| | |
|----------|---------------------------------------------------|
| 161-0798 | Resolving Gel Buffer, 1.5 M Tris-HCl, pH 8.8, 1 L |
| 161-0799 | Stacking Gel Buffer, 0.5 M Tris-HCl, pH 6.8, 1 L |

Related Products

| | |
|----------|--------------------------------------------------------------------------------------------------------|
| 161-5100 | SDS-PAGE Reagent Starter Kit, includes 100 g acrylamide, 5 g bis, 5 ml TEMED, 10 g ammonium persulfate |
| 163-2091 | ReadyPrep Proteomics Grade Water, 500 ml |

* Store acrylamide solutions at 4°C. All other reagents should be stored at room temperature, dry, and away from direct sunlight.

Crosslinkers and Catalysts

Pg 141

Crosslinkers

| | |
|----------|-----------------------------|
| 161-0200 | Bis Crosslinker, 5 g |
| 161-0201 | Bis Crosslinker, 50 g |
| 161-0142 | 2% Bis Solution, 500 ml |
| 161-0143 | 2% Bis Solution, 2 x 500 ml |
| 161-0202 | PDA Crosslinker, 10 g |
| 161-0620 | DATD Crosslinker, 25 g |

Catalysts

| | |
|----------|-----------------------------------------------------|
| 161-0800 | TEMED*, 5 ml (hazardous shipping charges may apply) |
| 161-0801 | TEMED, 50 ml |
| 161-0700 | Ammonium Persulfate (APS)*, 10 g |
| 161-0501 | Riboflavin-5'-Phosphate*, 10 g |

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

Certified Agaroses

Pg 142

| Description | 25 g | 125 g | 500 g |
|-----------------------------------------------------|----------|----------|----------|
| Certified Agaroses for Standard Applications | | | |
| Certified molecular biology agarose | 161-3100 | 161-3101 | 161-3102 |
| Certified PCR agarose | 161-3103 | 161-3104 | 161-3105 |
| Certified low range ultra agarose | 161-3106 | 161-3107 | — |
| Certified megabase agarose | 161-3108 | 161-3109 | 161-3110 |
| Certified low-melt agarose | 161-3111 | 161-3112 | — |
| Certified PCR low-melt agarose | 161-3113 | 161-3114 | 161-3115 |

Catalog # Description

| | |
|----------|---------------------------------------|
| 162-0137 | Pulsed Field Certified Agarose, 100 g |
| 162-0138 | Pulsed Field Certified Agarose, 500 g |

Catalog # Description

IEP/IEF Agaroses

Pg 142

| | |
|----------|---------------------------------|
| 162-0100 | Standard Low -m, Agarose, 100 g |
| 162-0102 | Standard Low -m, Agarose, 500 g |
| 162-0001 | High -m, Agarose, 50 g |
| 162-0022 | Zero -m, Agarose, 10 g |

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

Premixed Buffers and Buffer Reagents

Premixed Sample Loading Buffers

Pg 143

Premixed Protein Sample Loading Buffers

| | |
|----------|-------------------------------|
| 161-0737 | Laemmli Sample Buffer, 30 ml |
| 161-0738 | Native Sample Buffer, 30 ml |
| 161-0739 | Tricine Sample Buffer, 30 ml |
| 161-0763 | IEF Sample Buffer, 30 ml |
| 161-0764 | Zymogram Sample Buffer, 30 ml |
| 161-0791 | XT Sample Buffer, 4x, 10 ml |

Premixed Nucleic Acid Sample Loading Buffers

| | |
|----------|--------------------------------------|
| 161-0767 | 5x Nucleic Acid Sample Buffer, 10 ml |
| 161-0768 | 1x TBE-Urea Sample Buffer, 30 ml |

Premixed Gel-Casting Buffers

Pg 143

| | |
|----------|---------------------------------------------------|
| 161-0798 | Resolving Gel Buffer, 1.5 M Tris-HCl, pH 8.8, 1 L |
| 161-0799 | Stacking Gel Buffer, 0.5 M Tris-HCl, pH 6.8, 1 L |

Premixed Running Buffers

Pg 143

| Catalog # | Description | Catalog # | Description |
|-----------------------------------------|------------------------------------------|----------------------------------------------|------------------------------------------|
| Premixed Protein Running Buffers | | Premixed Nucleic Acid Running Buffers | |
| 161-0732 | 10x Tris/Glycine/SDS, 1 L | 161-0733 | 10x Tris/Boric Acid/EDTA (TBE), 1 L |
| 161-0772 | 10x Tris/Glycine/SDS, 5 L cube | 161-0770 | 10x Tris/Boric Acid/EDTA (TBE), 5 L cube |
| 161-0734 | 10x Tris/Glycine, 1 L | | extended range, 1 L |
| 161-0771 | 10x Tris/Glycine, 5 L cube | 161-0743 | 50x Tris/Acetic Acid/EDTA (TAE), 1 L |
| 161-0744 | 10x Tris/Tricine/SDS, 1 L | | |
| 161-0761 | 10x IEF Anode Buffer, 250 ml | | |
| 161-0762 | 10x IEF Cathode Buffer, 250 ml | | |
| 161-0765 | 10x Zymogram Renaturation Buffer, 125 ml | | |
| 161-0766 | 10x Zymogram Development Buffer, 125 ml | | |

Premixed Blotting Buffers and Buffer Reagents

Pg 144

| Catalog # | Description | Catalog # | Description |
|---------------------------------------------|------------------------------------|-----------------------------------------|---------------------------------------------------|
| Blot Transfer and Processing Buffers | | Detergents and Blocking Reagents | |
| 161-0734 | 10x Tris/Glycine, 1 L | 170-6537 | Gelatin, EIA grade, 200 g |
| 161-0771 | 10x Tris/Glycine, 5 L cube | 170-6404 | Blotting-Grade Blocker, nonfat dry milk, 300 g |
| 161-0778 | 10x Tris/CAPS, 1 L | 170-6531 | Tween 20, EIA grade, 100 ml |
| 161-0774 | 20x SSC, 1 L | 161-0781 | 10% (w/v) Tween 20, for easy pipetting, 1 L |
| 161-0775 | 20x SSC, 5 L cube | 161-0418 | SDS Solution, 20% (w/v), 1 L |
| 161-0780 | 10x Phosphate Buffered Saline, 1 L | 161-0783 | 1x Phosphate Buffered Saline with 1% Casein,* 1 L |
| 170-6435 | 10x Tris Buffered Saline, 1 L | 161-0782 | 1x Tris Buffered Saline with 1% Casein,* 1 L |

* Store at 2–8°C.

Reagents

| | | | |
|----------|----------------------------|----------|-----------------------------------------|
| 161-0610 | Dithiothreitol (DTT),* 1 g | 161-0710 | 2-Mercaptoethanol, 25 ml |
| 161-0611 | Dithiothreitol (DTT),* 5 g | 163-2101 | Tributylphosphine (TBP), 200 mM, 0.6 ml |
| 161-0729 | EDTA, 500 g | 161-0713 | Tricine, 500 g |
| 170-6537 | Gelatin, EIA grade, 200 g | 161-0716 | Tris, 500 g |
| 161-0717 | Glycine, 250 g | 161-0719 | Tris, 1 kg |
| 161-0718 | Glycine, 1 kg | 161-0730 | Urea, 250 g |
| 161-0724 | Glycine, 2 kg | 161-0731 | Urea, 1 kg |
| 163-2109 | Iodoacetamide, 30 g | | |

* Store desiccated at 2–8°C; store other reagents at room temperature, dry, and away from direct sunlight. Hazardous shipping charges may apply.

Ordering Information

Accessory Reagents

www.bio-rad.com

Accessory Reagents

Catalog # Description

Tracking Dyes

Pg 145

161-0404 **Bromophenol Blue**, 10 g
161-0423 **Xylene Cyanole FF**, 25 g

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

Detergents

Pg 145

161-0301 **SDS (Sodium Dodecyl Sulfate)**, 100 g
161-0302 **SDS (Sodium Dodecyl Sulfate)**, 1 kg
161-0416 **SDS Solution**, 10% (w/v), 250 ml
161-0418 **SDS Solution**, 20% (w/v), 1 L
170-6531 **Tween 20**, EIA grade, 100 ml
161-0407 **Triton X-100 Detergent**, 500 ml
161-0460 **CHAPS**,* 1 g
161-0781 **10% Tween 20**, for easy pipetting, 1 L

* Store desiccated at 4°C. All other reagents should be stored at room temperature, dry, and away from direct sunlight.

Bio-Lyte Ampholytes

Pg 145

| Catalog # | Description | Catalog # | Description |
|-----------|---------------------------------------------|-----------|---------------------------------------------|
| 163-1112 | Bio-Lyte 3/10 Ampholyte , 40%, 10 ml | 163-1192 | Bio-Lyte 5/8 Ampholyte , 40%, 10 ml |
| 163-1113 | Bio-Lyte 3/10 Ampholyte , 40%, 25 ml | 163-1193 | Bio-Lyte 5/8 Ampholyte , 40%, 25 ml |
| 163-1132 | Bio-Lyte 3/5 Ampholyte , 20%, 10 ml | 163-1162 | Bio-Lyte 6/8 Ampholyte , 40%, 10 ml |
| 163-1142 | Bio-Lyte 4/6 Ampholyte , 40%, 10 ml | 163-1163 | Bio-Lyte 6/8 Ampholyte , 40%, 25 ml |
| 163-1143 | Bio-Lyte 4/6 Ampholyte , 40%, 25 ml | 163-1172 | Bio-Lyte 7/9 Ampholyte , 40%, 10 ml |
| 163-1152 | Bio-Lyte 5/7 Ampholyte , 40%, 10 ml | 163-1182 | Bio-Lyte 8/10 Ampholyte , 20%, 10 ml |
| 163-1153 | Bio-Lyte 5/7 Ampholyte , 40%, 25 ml | | |

Catalog # Description

Cleaning Concentrate

Pg 145

161-0722 **Bio-Rad Cleaning Concentrate**, 50x, 1 kg

Gel Drying Solution

Pg 145

161-0752 **Gel Drying Solution**, 1 L

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 x 160 x 1.5 mm, 2 gels | — | 100 | 35(C) | — | 350 | 35(C) | 5 hr | HV or Universal |
| PROTEAN II XL cell | 183 x 200 x 1.5 mm, 2 gels | — | 100 | 35(C) | — | 350 | 35(C) | 5 hr | HV or Universal |
| Criterion™ cell | 133 x 87 x 1.0 mm, 2 gels | — | 200(C) | 200 | — | 200(C) | 80 | 55 min | Basic or HC |
| Mini-PROTEAN® Tetra cell | 83 x 73 x 1.0 mm, 4 gels | — | 200(C) | 240 | — | 200(C) | 120 | 35–45 min | Basic or HC |
| High-Throughput Electrophoresis | | | | | | | | | |
| PROTEAN Plus | 200 x 205 x 1.0 mm, 12 gels | — | 200(C) | 1,000 | — | 200(C) | 350 | 6 hr | HC or Universal |
| Dodeca™ cell | 250 x 205 x 1.0 mm, 12 gels | — | 200(C) | 1,000 | — | 200(C) | 350 | 6 hr | HC or Universal |
| | 256 x 230 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 x 200 x 1.5 mm, 6 gels | — | 150 | 480(C) | — | 500 | 480(C) | 5 hr | Universal |
| Criterion Dodeca cell | 133 x 87 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 x 73 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 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 x 1.0 mm tubes, 8 (minimum) | — | 750(C) | 1 | — | 750(C) | <1 | 3–4 hr | HV or Universal |
| Preparative Electrofocusing | | | | | | | | | |
| Rotofor® cell | 60 ml focusing chamber | 15(C) | 500 | 24 | 15(C) | 1,200 | 10 | 4 hr | HV |
| Mini Rotofor cell | 18 ml focusing chamber | 12(C) | 500 | 24 | 12(C) | 1,200 | 10 | 4 hr | HV |
| MicroRotofor™ cell | 2.5 ml focusing chamber | 1(C) | 100 | 10 | 1(C) | 500 | 2 | <3 hr | HV or Universal |
| Preparative PAGE | | | | | | | | | |
| Model 491 prep cell | — | 10(C) | 300 | 40 | 10(C) | 400 | 30 | 3–8 hr | HV or Universal |
| Mini prep cell | — | 1(C) | 200 | 5 | 1(C) | 300 | 3 | 3–8 hr | HV or Universal |
| Protein Electroelution | | | | | | | | | |
| Model 422 electro-eluter | 6 samples | — | 200 | 60(C) | — | 150 | 60(C) | 3–4 hr | Basic, HV, or Universal |
| Whole gel eluter | 160 x 140 mm or larger | — | 15 | 200(C) | — | 15 | 200(C) | 20 min | Basic |
| Mini whole gel eluter | 55 x 65 mm or larger | — | 10 | 100(C) | — | 10 | 100(C) | 20 min | Basic |
| Polyacrylamide Analytical Electrofocusing | | | | | | | | | |
| Model 111 mini IEF cell | 125 x 65 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 x 200 x 5 mm | — | 80(C) | 55 | — | 80(C) | 60 | 4 hr | Basic or HC |
| Mini-Sub® cell GT cell | 70 x 100 x 5 mm | — | 50(C) | 25 | — | 50(C) | 30 | 2 hr | Basic |
| Wide Mini-Sub cell GT cell | 150 x 100 x 5 mm | — | 50(C) | 35 | — | 50(C) | 40 | 2 hr | Basic |
| DNA Sequencing | | | | | | | | | |
| Sequi-Gen® GT system | 380 x 500 x 0.4 mm | 80(C) | 1,850 | 30 | 80(C) | 1,850 | 30 | 2–4 hr | HV |
| SSCP | | | | | | | | | |
| Sequi-Gen GT system | 210 x 400 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 x 400 x 0.4 mm | 50(C) | 2,100 | 25 | 50(C) | 2,100 | 25 | 2–3 hr | HV |
| Mutation Detection | | | | | | | | | |
| DCode™ system | 100 x 75 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 x 73 x 0.75 mm, 2 gels | — | 100(C) | 250 | — | 100(C) | 450 | 1 hr | HC |
| Criterion blotter | | | | | | | | | |
| Wire electrodes | 133 x 87 x 1.0 mm, 2 gels | — | 100(C) | 250 | — | 100(C) | 450 | 1 hr | HC |
| Plate electrodes | 133 x 87 x 1.0 mm, 2 gels | — | 100(C) | 650 | — | 100(C) | 1,600 | 30 min | HC |
| Trans-Blot® cell | | | | | | | | | |
| Wire electrodes | 200 x 160 x 1.5 mm, 1 gel | — | 60(C) | 210–250 | — | 60(C) | 210–250 | 5 hr | HC |
| Plate electrodes | 200 x 160 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 x 160 x 1.5 mm, 1 gel | — | 50–100(C) | 1,600 | — | 50–100(C) | 1,600 | 30 min | HC |
| Trans-Blot Plus cell | 265 x 280 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 x 180 x 1.5 mm | — | 15(C) | 500 | — | 15(C) | 200 | 15–30 min | HC |
| DNA/RNA | 150 x 150 x 6 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 x 24.5 x 6.5 cm | 25 x 28.5 x 8 cm | 27.5 x 34 x 10 cm | 27.5 x 34 x 10 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

Order Info: Pg 152



- Recommended for basic applications
- Compact, stackable
- Constant voltage or constant current output

For More Information
Request or download bulletin: 2881

See Also

Mini-PROTEAN Tetra cell: pages 155–156.
Criterion cell: page 160.
Sub-Cell systems: pages 211–216.

PowerPac™ HC High-Current Power Supply

Order Info: Pg 152



- Recommended for high-current applications
- Output of 250 V, 3.0 A, 300 W
- 2-line, 16-character LCD for programming
- Constant voltage, constant power, or constant current output

For More Information
Request or download bulletin: 2882

See Also

Criterion blotter: page 186.
Mini Trans-Blot cell: page 186.
Trans-Blot cell: page 187.
Trans-Blot Plus cell: page 187.
Dodeca cells: pages 156; 160; 166.

PowerPac™ HV High-Voltage Power Supply

Order Info: Pg 152



- Ideal for IEF and DNA sequencing
- Output of 5,000 V, 500 mA, and 400 W
- Protocol binder and text box to support IQ/OQ within GLP- and FDA-regulated environments

Optional temperature probe monitors gel temperature between 30 and 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: 3189

See Also

DNA sequencing systems: page 224.
MicroRotor cell: page 205.
Rotor cell and mini Rotor cell: page 205.
Model 491 prep cell and mini prep cell: page 206.

PowerPac™ Universal Power Supply

Order Info: Pg 152



- For all applications from mini vertical and high-throughput electrophoresis to blotting
- Protocol binder and text box to support IQ/OQ within GLP- and FDA-regulated environments

Wireless-run data transfer software organizes, displays, prints, analyzes, exports, and annotates run data from the power supply. Data can be sent directly to a PC with a peripheral IR receiving device.

For More Information
Request or download bulletin: 2885

See Also

High-throughput electrophoresis systems: pages 156; 160; 166.
Blotting systems: pages 183–189.

PowerPac™ Adaptor

Order Info: Pg 152



- Convert non-IEC-certified electrophoresis cells to fit output terminals of PowerPac power supplies
- Available in two sizes that fit most 2 mm and 4 mm banana plugs
- Compatible with the discontinued PowerPac 200, 300, 1000, and 3000 power supplies

Power Supplies

| Catalog # | Description | |
|----------------------------------------------|--------------------------------------------------------------------|---------------|
| PowerPac Basic Power Supply | | Pg 151 |
| 164-5050 | PowerPac Basic Power Supply, 100–120/220–240 V | |
| PowerPac HC High-Current Power Supply | | Pg 151 |
| 164-5052 | PowerPac HC Power Supply, 100–120/220–240 V | |
| PowerPac HV High-Voltage Power Supply | | Pg 151 |
| 164-5056 | PowerPac HV Power Supply, 100–120/220–240 V | |
| 164-5059 | PowerPac HV Power Supply with Temperature Probe, 100–120/220–240 V | |
| 164-5097 | PowerPac Data Transfer Software, version 2.0 | |
| 164-5099 | PowerPac HV IQ/OQ Protocol Binder | |
| 164-5098 | PowerPac HV IQ/OQ Protocol Binder and Test Box | |
| 165-5058 | PowerPac Temperature Probe | |
| PowerPac Universal Power Supply | | Pg 151 |
| 164-5070 | PowerPac Universal Power Supply, 100–120/220–240 V | |
| 164-5097 | PowerPac Data Transfer Software, version 2.0 | |
| 164-5069 | PowerPac Universal IQ/OQ Protocol Binder and Test Box | |
| PowerPac Adaptor | | Pg 151 |
| 164-5062 | PowerPac Adaptor, 2 mm | |
| 164-5064 | PowerPac Adaptor, 4 mm | |

Vertical Electrophoresis




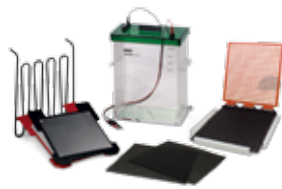
Bio-Rad offers complete electrophoresis systems — cells, equipment, and precast gels — to accommodate a variety of formats and throughput needs.

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 4 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 | PROTEAN II System | PROTEAN Plus System |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| |  |  |  |  |
| Advantages | <p>Run 1–4 precast or handcast gels in mini format</p> <p>Wing clamp assembly allows faster 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>Useful for discovery projects and evaluating sample preparation conditions</p> | <p>Fast setup with drop-in gel and cell design (precast or handcast)</p> <p>Run 1–2 precast Criterion or handcast gels</p> <p>Integrated upper buffer chamber allows 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>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>The PROTEAN Plus Dodeca cell offers a high level of throughput (with the ability to run up to 12 gels)</p> |
| Compatible Gel Formats | | | | |
| Precast | <p>Mini-PROTEAN precast gels (pages 157–158)</p> <p>Ready Gel® precast gels (page 158)</p> | <p>Criterion, Criterion TGX, and Criterion XT precast gels (pages 161–162)</p> | | |
| Handcast | <p>Ready Gel empty cassettes</p> <p>Mini-PROTEAN casting plates (page 155)</p> | <p>Criterion empty cassettes (page 163)</p> | <p>PROTEAN II casting plates (page 165)</p> | <p>PROTEAN Plus casting equipment (page 167)</p> |
| Electrophoresis Cells | | | | |
| | <p>Mini-PROTEAN Tetra (pages 155–156)</p> <p>Mini-PROTEAN 3 Dodeca (page 156)</p> | <p>Criterion (page 160)</p> <p>Criterion Dodeca (page 160)</p> | <p>PROTEAN II xi/XL (pages 164–165)</p> <p>PROTEAN II xi/XL multi-cells (page 166)</p> | <p>PROTEAN Plus Dodeca (page 166)</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 6.7 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 186) Criterion blotter (page 186) Trans-Blot® cell (page 187) | Criterion wire blotter (page 186) Criterion plate blotter (page 186) Trans-Blot cell (page 187) Trans-Blot Plus cell (page 187) | Trans-Blot cell (page 187) Trans-Blot Plus cell (page 187) | Trans-Blot Plus cell (page 187) |
| Semi-dry transfer | Trans-Blot SD cell (page 185) Trans-Blot Turbo (page 184) | Trans-Blot SD cell (page 185) Trans-Blot Turbo (page 184) | Trans-Blot SD cell (page 185) | |

Precast Gels

Bio-Rad offers a broad range of precast gels including two size formats of polyacrylamide gels for a number of vertical protein and nucleic acid electrophoresis applications, and one set of agarose gels for horizontal nucleic acid electrophoresis. These gels are part of complete systems of compatible electrophoresis and blotting cells. Refer to the following table to select the appropriate gel type and buffers for your polyacrylamide gel-based applications.

Availability of Precast Gel Types Based on Application

| Gel Type | Mini-PROTEAN | Ready Gel | Criterion | Application | Sample Buffer | Running Buffer |
|--------------|--------------|-----------|-----------|--------------------------------------------|-------------------|----------------------------------|
| TGX™ | • | | • | SDS-PAGE Native PAGE | Laemmli Native | Tris/glycine/SDS Tris/glycine |
| Tris-HCl | | • | • | SDS-PAGE Native PAGE | Laemmli Native | Tris/glycine/SDS Tris/glycine |
| Stain-Free™ | • | | • | SDS-PAGE Native PAGE | Laemmli Native | Tris/glycine/SDS Tris/glycine |
| Bis-Tris | | | • | SDS-PAGE for small to large proteins | XT | XT MOPS or XT MES |
| Tris-acetate | • | | • | SDS-PAGE for large proteins Native PAGE | XT Native | XT Tricine Tris/glycine |
| Tris-Tricine | • | | • | SDS-PAGE for peptides, small proteins | Tricine | Tris/Tricine/SDS |
| IEF | • | • | • | IEF | IEF | Anode and cathode buffer |
| TBE | • | | • | dsDNA separation | Nucleic acid | Tris/boric acid/EDTA |
| TBE-urea | • | | • | ssDNA and RNA separation | TBE-urea | Tris/boric acid/EDTA |
| Zymogram | • | • | • | Protease detection | Zymogram | Tris/glycine/SDS |

In general, single-percentage gels will best separate bands that are close in MW. If your sample contains a broad range of MWs, a gradient gel allows both high- and low-MW bands to be resolved on the same gel. Molecules with a range of sizes can be separated on linear gradient gels because the larger pore sizes allow resolution of larger molecules, while pore sizes that decrease towards the bottom of the gel restrict excessive separations of small molecules.

Precast Gel Crosslinker Percentage by Gel Type

| | Tris-HCl | Zymogram | Tris-Tricine | IEF | TBE | TBE-Urea | Tris-Acetate | Bis-Tris |
|----|----------|----------|--------------|------|------|----------|--------------|----------|
| %C | 2.6% | 2.6% | 3.3% | 3.3% | 3.3% | 3.3% | 3.8% | 5.0% |

Mini-Format Vertical Electrophoresis

The Mini-PROTEAN® system includes the four-gel Mini-PROTEAN Tetra cell and the high-throughput Mini-PROTEAN® 3 Dodeca™ cell (for running up to 12 gels). The systems are compatible with handcast or precast gels.

Mini-PROTEAN® Tetra Cell

Order Info: Pg 168

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 4 gels (10 x 8.3 cm) using 2 running modules

Modular Cells for Many Applications

- Interchangeable modules convert a Mini-PROTEAN Tetra cell into a Mini Trans-Blot® electrophoresis transfer cell for western blotting

Gel Casting

- Ground glass plates with permanently bonded spacers and improved casting gaskets guarantee perfect alignment and leakproof casting
- Casting frames*** with simple cam closure provide precision alignment on any flat surface
- Side-by-side casting stand*** allows access to both gels simultaneously, and the spring-loaded lever creates a tight seal against the silicon rubber gasket
- Plastic combs*** do not inhibit polymerization and have built-in ridges to eliminate air contact during gel casting for uniform gel polymerization
- Glass plates and combs are labeled with thickness and number of wells for instant identification
- Thick glass spacer plates reduce breakage

Configuring Your Own Electrophoresis Cell

You can choose one of the preset configurations by ordering catalog #165-8000 (10-well, 0.75 mm) or #165-8001 (10-well, 1.0 mm). To configure your own electrophoresis cell, order the Mini-PROTEAN Tetra cell (catalog #165-8004) and select a casting module from the ordering information (see page 168).

For More Information

Web: www.bio-rad.com/tetra

Request or download bulletin: 5535

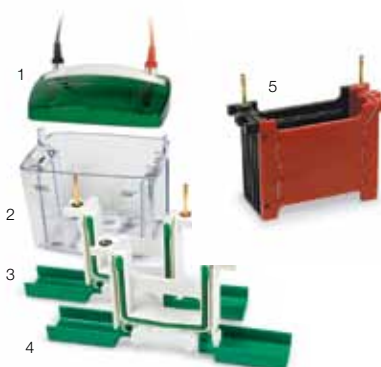
Mini-PROTEAN Tetra cell components:

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.

See Also

PowerPac Basic and PowerPac HC power supplies: page 151.

Premixed buffers and buffer reagents: pages 143–144.

Mini-PROTEAN precast gels: page 157.

Vertical Electrophoresis

Mini-Format Vertical Electrophoresis

www.bio-rad.com/verticalelectro

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 x 8.3 cm | Recommended power supply | PowerPac™ Basic or PowerPac HC |
| Glass plate size (W x L) | Short plate: 10.1 x 7.3 cm | Dimensions (W x L x H) | 12 x 16 x 18 cm |
| | Spacer plate: 10.1 x 8.2 cm | Weight | 1 kg (2.2 lb) |

See Also

PowerPac HC power supply: page 151.

Mini-PROTEAN precast gels: page 157.

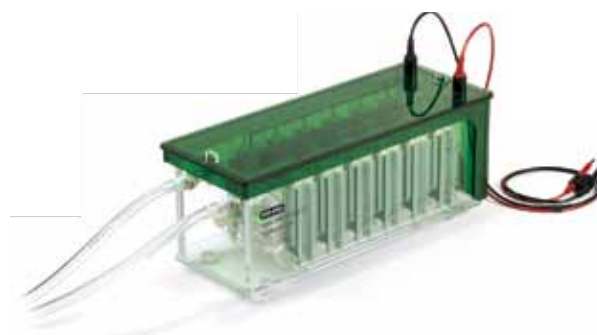
AnyGel stands: page 159.

Mini-PROTEAN® 3 Dodeca™ Cell

Order Info: Pg 169

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 159) and Model 485 gradient former (see page 159). Alternatively, use precast gels. Features of the Mini-PROTEAN 3 Dodeca cell include:

- Built-in cooling coil to prevent overheating
- Stirbar capability that 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 x 8.3 cm |
| Gel thickness | 0.5, 0.75, 1.0, or 1.5 mm (precast gels are only available 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.

Mini-PROTEAN® Precast Gels

Order Info: Pg 169

Mini-PROTEAN® TGX™ Precast Gels

Long shelf life Mini-PROTEAN TGX precast gels for PAGE accelerate electrophoresis and blotting while delivering superior performance. TGX gels maintain cooler temperatures at high voltages, allowing run times as short as 15 minutes. The gels are designed to provide Laemmli-like separation patterns using the standard Tris/glycine/SDS running buffer system. Mini-PROTEAN gels are compatible with the Mini-PROTEAN Tetra (1–4 gels) and Dodeca™ cells (1–12 gels). These gels can also be used in the earlier Mini-PROTEAN 3 cell model.

Mini-PROTEAN TGX gels provide:

- Run times as short as 15 min
- Transfer times as short as 3 min with the Trans Blot® Turbo™ transfer system
- 12-month shelf life
- Laemmli format
- Inexpensive buffer system, low running costs
- Bottom-open cassette design for simple gel handling and blotting

Mini-PROTEAN® TGX Stain-Free™ Precast Gels

Mini-PROTEAN TGX Stain-Free precast gels combine TGX formulation with a proprietary compound that facilitates protein visualization in less than 5 minutes using the Gel Doc™ EZ or ChemiDoc™ MP imaging systems (see pages 233–234).

Mini-PROTEAN TGX Stain-Free precast gels eliminate the need for staining, reducing the time to results and improving the ease of downstream processing. In addition to the 12-month shelf life, Laemmli buffer system, and fast run times of the TGX formulation, the Mini-PROTEAN TGX Stain-Free gels provide:

- Complete protein separation, gel imaging, and data analysis in 20 min
- Sensitivity comparable to that of Coomassie stain
- Better reproducibility and quantitation compared to staining procedures
- Capability of using the same gel for downstream western blotting, standard staining methods, and mass spectrometry analysis

Empty Cassettes for Hand Casting

Single-use empty Mini-PROTEAN cassettes are available to hand cast gels. For added convenience, cast your gels using AnyGel™ stands or the Mini-PROTEAN casting stand.

For More Information

Web: www.bio-rad.com/tgx

Request or download bulletins: 5535 and 5871

**Mini-PROTEAN Gels****Mini-PROTEAN Tris-Acetate Precast Gels**

- Formulated to provide superior separation of large MW proteins when run with Tricine running buffer
- The gels are made without SDS, so they can also be used for native PAGE

Mini-PROTEAN Tris-Tricine Precast Gels

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

Mini-PROTEAN IEF Precast Gels

- For the separation of proteins based on their net charge (pI) rather than MW
- IEF gels contain no denaturing agents, allowing one-dimensional separation under native conditions

Mini-PROTEAN TBE and TBE-Urea Precast Gels

- Ideal for the separation of DNA and RNA
- TBE gels are suitable for electrophoresis of nucleic acids from 50 to 2,000 base pairs
- TBE-urea gels are best suited for the separation of ssDNA and ssRNA between 60 and 200 base pairs

Mini-PROTEAN Zymogram Precast Gels

- Used for protease detection, the gels contain either casein, which is a substrate for various proteases, or gelatin
- Samples with proteolytic activity can be visualized as clear bands against a blue background after using Coomassie Brilliant Blue R-250 stain

For More Information

Web: www.bio-rad.com/mpgels

Request or download bulletin: 6040

Vertical Electrophoresis

Mini-Format Vertical Electrophoresis

www.bio-rad.com/verticalelectro

Gel Cassette Specifications

| | |
|------------------------------------------------|----------------------------------|
| Gel dimensions (W x L x thickness) | 86 x 67 x 1 mm |
| Gel cassette dimensions (W x L x thickness) | 101 x 89 x 46 mm |
| Cassete material | Styrene copolymer |
| Comb material | Polycarbonate |
| Gel storage conditions | Store flat at 4°C; do not freeze |

Mini-PROTEAN Precast Gel Selection Guide

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

* From date of manufacture.

See Also

ReadyStrip IPG strips: page 122.
Standards: pages 131–136.
Electrophoresis stains: pages 179–181.
Mini Trans-Blot cell: page 186.
Blot detection: pages 197–201.
PowerPac Basic and PowerPac HC power supplies: page 151.
Imaging systems: pages 232–237.
Premixed buffers: pages 143–144.

Ready Gel® Precast Gels

Order Info: Pg 170

Proteins and nucleic acids can be separated by Ready Gel precast gels using the Mini-PROTEAN® Tetra electrophoresis cell (1–4 gels; pages 155–156) or, for high-throughput applications, the Mini-PROTEAN® 3 Dodeca™ cell (1–12 gels; page 156). 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

Request or download bulletin: [Ready Gel Application Guide \(LIT 188\)](#)



Specifications

| | |
|-----------------------------------------|-----------------------------------------------------------------------------------|
| Gel dimensions (W x L x thickness) | 8.3 x 6.4 x 0.1 cm |
| Cassette dimensions (W x L x thickness) | 1 x 0.8 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.

Mini-PROTEAN® Hand Casting Accessories

Order Info: Pg 171

See Also

Acrylamide gel-casting reagents: page 141.
Buffers: page 143.

Empty Cassettes

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

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.

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 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN mini gels.

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.

Model 485 Gradient Former

The Model 485 gradient former allows you to pour linear, concave, or convex exponential acrylamide gradients for PAGE. Its 40–175 ml capacity is designed to pour up to 12 gradient gels in the Mini-PROTEAN 3 multi-casting chamber. The optional exponential piston is required to form concave or convex exponential acrylamide gradients.

For More Information

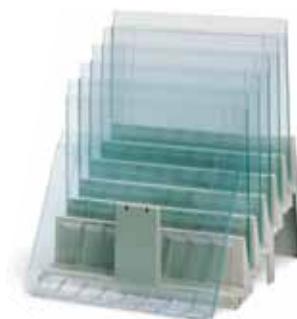
Web: www.bio-rad.com/mphandcast



Ready Gel Empty Cassettes



AnyGel Single-Row Stand with Mini-PROTEAN Cassettes



AnyGel Six-Row Stand



Model 485 Gradient Former



Mini-PROTEAN 3 Multi-Casting Chamber

Midi-Format Vertical Electrophoresis

The Criterion™ and the Criterion™ Dodeca™ electrophoresis cells accommodate precast or handcast Criterion gels that are wider and longer than traditional mini gels for increased throughput and separation.

See Also

Criterion precast gels and empty cassettes: pages 161–163.
 Criterion blotter: page 186.
 PowerPac Basic and PowerPac HC power supplies: page 151.
 Dodeca stainers: page 163.
 AnyGel stands: page 163.

Criterion™ Cell

Order Info: Pg 172

The Criterion electrophoresis cell is dedicated to running one or two midi gels,* which are wider and longer than traditional mini gels (13.3 x 8.7 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

See Also

PowerPac Basic and PowerPac HC power supplies: page 151.
 Criterion precast gels and accessories: pages 161–163.
 Trans-Blot Plus cell: page 187.
 Dodeca stainers: page 163.
 Imaging systems: pages 232–237.
 Imaging software: pages 242–245.

Criterion™ Dodeca™ Cell

Order Info: Pg 172

The Criterion Dodeca cell has the capacity to run up to 12 handcast or Criterion precast gels* simultaneously. Criterion gels accommodate 11 cm ReadyStrip™ IPG strips.

- Locator slots to slide cassettes into place without alignment hassles or bulky clamps
- Built-in cooling coil to prevent overheating and ensure the highest resolution
- Stirbar capability that maintains uniform buffer tank temperatures for reproducible runs
- A cassette opener built into the cell for easy gel access
- Convenient buffer draining via the built-in quick-connect drain port



For More Information

Web: www.bio-rad.com/criteriondodeca
 Request or download bulletin: 2622

| 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 x 19.2 cm |
| Weight | 0.86 kg (1.9 lb) | 4.8 kg (11 lb) |

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

Criterion™ Precast Gels

Order Info: Pg 173

See Also

Premixed buffers:
pages 143–144.

ReadyStrip IPG strips:
page 122.

Criterion blotter:
page 186.

PowerPac
power supplies:
pages 149–151.

Dodeca stainers:
page 163.

Criterion staining
trays: page 163.

Standards:
pages 131–138.

Electrophoresis
stains:
pages 179–181.

Criterion precast gels include a broad selection of 13.3 x 8.7 cm polyacrylamide gels in single-use cassettes. This gel size provides reproducible, high-resolution results with fast setup, loading, and run times. The gels are wider and longer than traditional mini gels for high-throughput electrophoresis. Criterion gels are packaged and sold in individual units: 1–2 gels can be run in the Criterion cell (page 160) and 1–12 gels can be run in the high-throughput Criterion™ Dodeca™ cell (page 160).

- 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

Available Chemistries

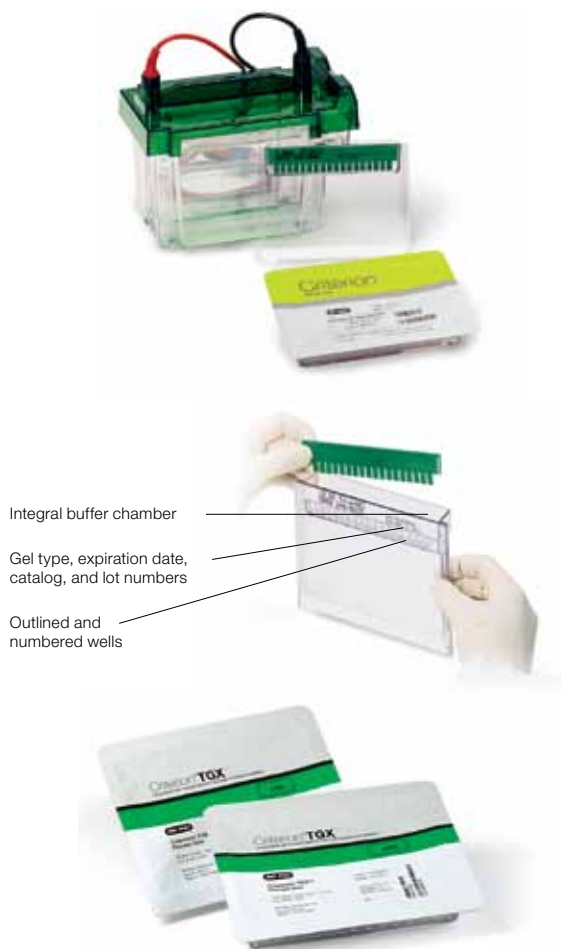
| | |
|-----------------|---------------------------------------------------------------------------------------------------|
| IEF | pH 3–10, 5–8 |
| Stain-Free | 10%, 4–20%, 8–16% Tris-HCl |
| TBE | 5%, 10%, 15%, 4–20% |
| TBE-urea | 5%, 10%, 15% |
| TGX | 7.5%, 10%, 12%, 18% resolving 4–15%, 4–20%, 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 |

Criterion TGX Precast Gels

Utilizing the Laemmli buffer system and having a 12-month shelf life, these precast gels 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

* U.S. patents 5,073,246 and 6,093,301.



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.

Criterion™ TGX Stain-Free™ Precast Gels

Criterion TGX Stain-Free precast gels combine TGX formulation with a proprietary compound that facilitates protein visualization in less than 5 minutes using the Gel Doc™ EZ or ChemiDoc™ MP imaging systems (see pages 233 and 234).

Criterion TGX Stain-Free precast gels eliminate the need for staining. In addition to the 12-month shelf life, Laemmli buffer system, and fast run times of the TGX formulation, the Criterion TGX Stain-Free gels provide:

- Complete protein separation, gel imaging, and data analysis in 25 min
- Comparable sensitivity to Coomassie stain
- Better reproducibility and quantitation compared to staining procedures
- Use of the same gel for downstream western blotting, standard staining methods, and mass spectrometry analysis

For More Information

Web: www.bio-rad.com/criteriontgx

Request or download bulletin: 5974



Extended Shelf-Life Criterion XT Gels for SDS-PAGE and Native PAGE

Criterion XT gels are formulated at near-neutral pH to ensure longer shelf life (12 months for Bis-Tris gels, 8 months for Tris-acetate gels) and improved protein stability. Criterion XT gels are run using optimized sample and running buffers — without the need for antioxidant addition — for sharp bands and minimal preparation time. Like traditional Laemmli systems, Criterion XT gels use discontinuous buffer that forms moving boundaries to stack and then separate proteins.

Criterion XT Bis-Tris gels are formulated by using a Bis-Tris buffer system (pH 6.4) for separation of proteins by MW. By selecting from two running buffers (MOPS or MES) you can expand the separation capability of a single Bis-Tris gel type.

Criterion Stain Free™ Precast Gels

Criterion Stain Free gels have Tris-HCl formulation for PAGE applications and a proprietary compound that facilitates protein visualization using a stain-free enabled imager (Gel Doc EZ or ChemiDoc MP imaging system). The stain-free technology allows direct visualization, analysis, and documentation of protein samples in PAGE gels without staining, destaining, and gel drying procedures.

For More Information

Web: www.bio-rad.com/criteriongels

Specifications

| | |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gel dimensions | 13.3 x 8.7 cm (W x L); 1.0 mm thick |
| Cassette dimensions | 15.0 x 10.6 cm (W x L); 5.3 mm thick |
| Cassette material | Styrene copolymer |
| Comb material | Polycarbonate |
| Storage tray material | PET |
| Gel storage conditions | Store flat; do not freeze Room temperature for Bis-Tris gels 4°C for all other gel types |
| Gel shelf life* | 12 months for TGX and Bis-Tris gels 8 months for Tris-acetate gels 12 weeks for Tris-HCl, Tris-Tricine, zymogram, TBE, TBE-urea gels 26 weeks for IEF gels |
| Buffer volume | Upper, 60 ml; lower, 400 ml |

* From date of manufacture.

Criterion™ Accessories

Order Info: Pg 174

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 157.

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 optimal blot detection. These dimensions provide a working volume of up to 500 ml.

Dodeca™ High-Throughput Stainers

Dodeca stainers are high-throughput gel staining devices available in two sizes: the small size accommodates up to 24 Criterion gels while the large size can accommodate up to 12 large-format gels. The stainers eliminate risk of gel breakage from excess handling. Features of the stainers include:

- A patented* shaking rack designed to hold the staining trays at an angle to allow air bubbles to escape, ensure uniform gel staining, and protect gels from breaking
- Compatibility with Bio-Safe™ Coomassie, Coomassie, SYPRO Ruby, Flamingo™, and silver stains



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 cm | PROTEAN® Plus precast |
| | 25 x 20.5 cm | PROTEAN Plus handcast (requires one attachment per tray) |
| Small Dodeca stainer | 20 x 20.5 cm | PROTEAN Plus handcast |
| | 18.5 x 20 cm | PROTEAN II XL handcast |
| | 18.3 x 19.3 cm | PROTEAN II XL precast |
| | 16 x 20 cm | PROTEAN II xi handcast |
| | 16 x 16 cm | PROTEAN II xi handcast and precast |
| | 13.3 x 8.7 cm | Criterion (up to 24 gels, requires one attachment per tray) |

Specifications

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number of gels | 1–12 large format gels in the large Dodeca stainer; 1–24 Criterion gels in the small Dodeca stainer (minimum of 4 gels recommended for silver staining) |
| Shaker device | Built-in shaker motor |
| Maximum staining solution volume | 10 L for the large Dodeca stainer, 7 L for the small Dodeca stainer |
| Compatible stains | Bio-Safe colloidal Coomassie Brilliant Blue G-250 stain, Coomassie Brilliant Blue R-250 stain, SYPRO Ruby protein gel stain, Flamingo fluorescent gel stain, Dodeca silver stain kit |
| Dimensions (W x L x H) | 41.3 x 46.2 x 38.9 cm for both the large and small Dodeca stainers |
| Weight (empty) | 9.1 kg (20 lb) for the large Dodeca stainer 7.5 kg (17 lb) for the small Dodeca stainer |

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

Large-Format Vertical Electrophoresis

See Also

PowerPac Universal and PowerPac HV power supplies: page 151.

PROTEAN II multi-gel casting chamber: page 166.

PROTEAN II xi and XL accessories: page 165.

PROTEAN II xi and XL multi-cells: page 166.

Trans-Blot and Trans-Blot Plus cells: page 187.

Gel clip: page 167.

Dodeca stainers: page 167.

PROTEAN® II xi and XL Cells

Order Info: Pg 175

These large format cells can be used for protein and nucleic acid electrophoresis applications.

The PROTEAN II xi cell is available in two sizes to accommodate up to four* 16 x 16 cm or 16 x 20 cm gels. For 1-D electrophoresis, use the PROTEAN II xi cell. For 2-D analysis, use the PROTEAN II XL cell to run second-dimension gels (approximately 18.5 x 20 cm) that accommodate 17 cm IPG strips. Features include:

- Single-screw clamps on the casting stand exert uniform pressure along the entire length of the glass plates, providing a leakproof seal without grease or agarose plugs
- A central cooling core provides smile-free migration patterns with as little as 1.5 L of buffer
- A choice of glass plates, spacers, and sandwich clamps to cast 2 gel lengths, 16 or 20 cm
- Ability to cast multiple gradient gels using the PROTEAN II multi-gel casting chamber and the Model 495 gradient former
- Notched plates that allow up to four 16 x 16 cm or 16 x 20 cm handcast gels to be run simultaneously (not recommended for 2-D applications)
- Optional frosted glass plates for high-resolution vertical agarose electrophoresis of nucleic acids; comb conversion screws to convert any PROTEAN II xi comb from a standard 25 mm well depth to a 10 mm depth to simplify comb removal

For More Information

Web: www.bio-rad.com/largeelectro

Request or download bulletin: 1760

PROTEAN II IPG Conversion Kits for 2-D Applications

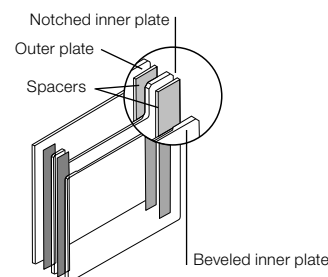
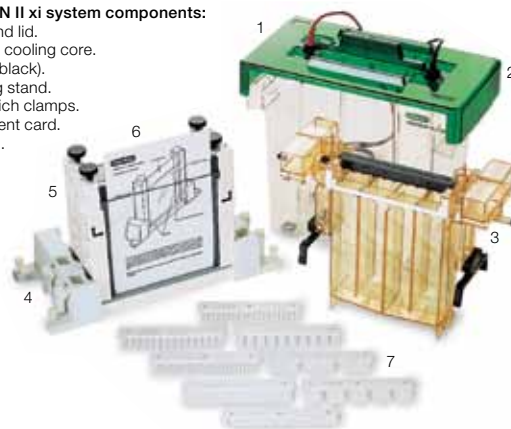
PROTEAN II IPG conversion kits expand the size of the classic PROTEAN II xi cell and multi-cell to the XL format to accommodate second-dimension electrophoresis runs using IPG strips. Three conversion kits are available to accommodate different gel thicknesses.

Features of the conversion kits include:

- Gel width is expanded to 18.5 cm to fit 17 cm and 18 cm ReadyStrip™ IPG strips
- Conversion kits include gel clamps, spacers, 2-D combs, gaskets, and glass plates for 1.0 mm, 1.5 mm, or 2.0 mm thick 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.

- The PROTEAN II IPG conversion kit is included with the PROTEAN II XL cells

Conversion kits expand the capabilities of the PROTEAN II xi cell to include applications such as tube gel IEF and second-dimension SDS-PAGE. To convert the PROTEAN II xi cell into a:

- **PROTEAN xi 2-D cell** — use available adaptors and other accessories to accommodate 16 tube gels for IEF applications
- **PROTEAN II XL cell** — use the optional PROTEAN II IPG conversion kit for 2-D electrophoresis of 17 cm IPG strips

* For higher throughput, the PROTEAN II xi multi-cell provides 6-gel capacity for second-dimension runs.

Specifications

| | PROTEAN II xi (16 cm) | PROTEAN II xi (20 cm) | PROTEAN II XL (20 cm) |
|---------------------------------|---------------------------------------|--------------------------------------|--------------------------------------|
| Number of gels | 1–4 | 1–4 | 1–4 |
| Gel size (W x L) | 16 x 16 cm (handcast) | 16 x 20 cm (handcast) | 18.3 x 20 cm (handcast) |
| Glass plate size (W x L) | | | |
| Inner plate | 20 x 16 cm | 20 x 20 cm | 20 x 20 cm |
| Outer plate | 20 x 18.3 cm | 20 x 22.3 cm | 20 x 22.3 cm |
| Spacer length | 18.3 cm | 22.3 cm | 22.3 cm |
| Typical upper buffer volume | 350 ml | 350 ml | 350 ml |
| Typical lower buffer volume | 1.8 L | 1.2 L | 1.2 L |
| Typical run times for SDS-PAGE* | | | |
| Without cooling | 4 hr | 5 hr | 5 hr |
| With cooling | 2.5 hr | 3.5 hr | 3.5 hr |
| Recommended power supply | PowerPac™ HV or PowerPac Universal | PowerPac HV or PowerPac Universal | PowerPac HV or PowerPac Universal |

* For voltage and current settings for electrophoresis applications, see pages 149–150.

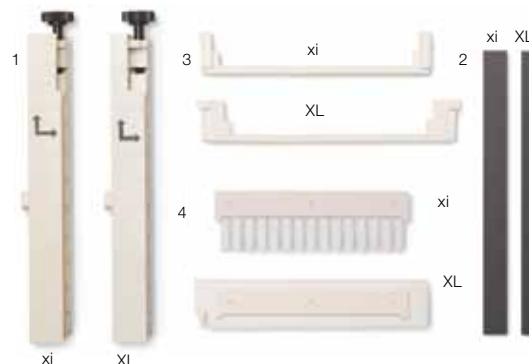
PROTEAN® II xi and XL Accessories

Order Info: Pg 175

PROTEAN II xi and XL accessories and replacement parts are available for hand casting gels and for electrophoresis runs. The slab gel casting stand, glass plates, spacers, and combs are required for hand casting gels using the PROTEAN II xi and XL cells. See page 166 for the PROTEAN II multi-gel casting chamber, which allows casting of up to 10 single or 12 doubled-up gels. See page 167 for information about the gel clip (catalog #165-3414), a tool that facilitates large format gel handling.

For More Information

Web: www.bio-rad.com/largeelectro

**PROTEAN II xi and XL (IPG) component comparison:**

1. The 4 mm xi and 13 mm XL clamp notches.
2. The 19 mm xi and 8 mm XL spacers.
3. The 181 mm xi and 198 mm XL central cooling core gaskets.
4. The 153 mm xi and 184 mm XL combs.

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.

Vertical Electrophoresis

Large-Format Vertical Electrophoresis

www.bio-rad.com/largeelectro

See Also

PowerPac Universal power supply: page 151.
Premixed buffers and buffer reagents: pages 143–144.
Dodeca stainers: page 167.

PROTEAN® II xi and XL Multi-Cells

Order Info: Pg 176

The PROTEAN II xi and XL multi-cells can run up to 6 gels:

- Efficient cooling for high-power 2-D runs is provided by 2 cooling coils and 3 cooling cores (requires a refrigerated circulating bath and operation at 4°C for optimal results)
- High-power runs enable rapid separation with minimal protein diffusion and sharper protein spots or bands

Choose the length of gel, comb, type of glass plates, and cooling system that best fit your applications. For 1-D electrophoresis, use the PROTEAN II xi cell to run 16 x 16 cm and 16 x 20 cm gels. For 2-D analysis, use the PROTEAN II XL cell to run second-dimension gels (approximately 18.5 x 20 cm) that accommodate 17 cm IPG strips.



See Also

Acrylamide gel-casting reagents: page 141.
Buffers: page 143.

PROTEAN® II Multi-Gel Casting Chamber

Order Info: Pg 176

Allows up to 10 single or 12 doubled-up 1.5 mm thick gels to be cast simultaneously; cast even more gels when thinner spacers are used.

- Top filling for uniform single-percentage gels
- Bottom filling for reproducible gradient gels using the Model 495 gradient former (page 167)
- Accommodation of both 16 and 20 cm gels

The casting chamber includes acrylic blocks for space fillers when fewer than 10 gels are used, and reusable separation sheets for easy separation of the gel sandwiches after casting.



See Also

PowerPac HC and PowerPac Universal power supplies: page 151.
Dodeca stainers: page 167.
Gel clip: page 167.

PROTEAN® Plus Dodeca™ Cell

Order Info: Pg 177

The PROTEAN Plus Dodeca cell* accommodates up to 12 large slab gels, matching the capacity of 1-D runs in the PROTEAN IEF system for high-throughput 2-D applications. Features include:

- Capacity to run 1–12 gels
- Ceramic cooling core, buffer recirculation pump,** and refrigerated circulator that provide efficient cooling — temperature of buffer surrounding gels varies by ≤1°C
- Plate electrodes** that create an optimally uniform electrical field to give straight horizontal run results
- Differential plate heights that facilitate easy IPG strip or tube gel loading; the AnyGel™ stand (page 167) can be used to stabilize and position gels while loading



For More Information
Request or download bulletin: 2621

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

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

Large-Format Electrophoresis Accessories

Order Info: Pg 177

See Also

Acrylamide gel-casting reagents: page 141.

Buffers: page 143.

AnyGel stands: page 159.

PROTEAN® Plus Combs and Hinged Spacer Plates

PROTEAN Plus hinged spacer plates are two glass plates joined together by a silicone hinge with integrated spacers bonded onto the long plate to guarantee perfect alignment during casting and eliminate potential current leaks. The differential plate heights facilitate easy IPG strip or tube gel loading. The hinged spacer plate sizes are the same for both gel sizes (20 and 25 cm wide). Combs are available for both 20 and 25 cm wide gel sizes and 1.0, 1.5, or 2.0 mm thick gels.



Hinged Spacer Plates

PROTEAN Plus Multi-Casting Chamber

Use the PROTEAN Plus multi-casting chamber to cast up to 12 gels of 1.0, 1.5, or 2.0 mm thickness simultaneously. The chamber accommodates the PROTEAN Plus hinged spacer plates for both 20 and 25 cm wide gel sizes. Acrylic blocks act as space fillers when fewer than 12 gels are cast, and a leveling bubble ensures level interfaces. Gradient gels are cast through a bottom port using the Model 495 gradient former (below).



PROTEAN Plus Multi-Casting Chamber

Dodeca™ High-Throughput Stainers

Dodeca stainers are available in two sizes: the small size accommodates up to 24 Criterion™ gels while the large size can accommodate up to 12 large format gels. The stainers ensure consistent results and eliminate gel breakage from excess handling.



Large Dodeca Stainer

Model 556 Gel Destainer

This destainer uses clear, stackable trays to destain up to four 16 x 20 cm slab gels, forty 6 x 170 mm tube gels, or a combination of gel sizes in 1 hour.

- The flow pattern of the destaining solution ensures uniform destaining of every gel
- A stirbar controls the flow rate of the destaining solution
- Reduced destaining time and no need to change the destaining solution



Model 556 Gel Destainer

Model 495 Gradient Former

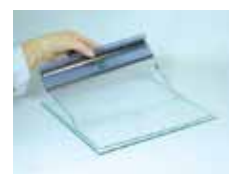
This gradient former allows you to pour linear or convex exponential acrylamide gradients. Its 100–1,500 ml capacity is designed to pour up to 12 gradient slab gels in the PROTEAN Plus multi-casting chamber. The optional exponential piston is required to form convex exponential acrylamide gradients.

PROTEAN II xi Plate Washer/Holder

The PROTEAN II xi plate washer/holder takes the tedium out of washing glass plates while greatly reducing the potential for plate damage. Each rack holds up to 8 PROTEAN II xi plates or 18 Mini-PROTEAN® II plates. The plate washing tank is ideal for soaking plates and for long-term dust-free storage. Hooks suspend the rack above the washing tank for complete plate drainage.



PROTEAN II xi Plate Washer/Holder



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

AnyGel™ Stands

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

Gel Clip

The gel clip facilitates the handling of large format gels and eliminates gel breakage by minimizing direct hands-on gel manipulation. The gel clip gently but securely clamps along one edge of a gel, distributing the weight evenly so that the gel can be easily lifted without tearing.

Vertical Electrophoresis

Mini-Format Vertical Electrophoresis

Catalog # Description

| Mini-PROTEAN Tetra Cell | | Pg 155 |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 165-8000 | Mini-PROTEAN Tetra Cell , 10-well, 0.75 mm thickness; 4-gel system includes 5 combs, 5 sets of glass plates, 2 casting stands, 4 casting frames, sample loading guide, electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam | |
| 165-8001 | Mini-PROTEAN Tetra Cell , 10-well, 1.0 mm thickness; 4-gel system includes 5 combs, 5 sets of glass plates, 2 casting stands, 4 casting frames, sample loading guide, electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam | |
| 165-8002* | Mini-PROTEAN Tetra Cell , 10-well, 0.75 mm thickness; 2-gel system includes 5 combs, 5 sets of glass plates, casting stand, 2 casting frames, sample loading guide, electrode assembly, tank, lid with power cables, mini cell buffer dam | |
| 165-8003* | Mini-PROTEAN Tetra Cell , 10-well, 1.0 mm thickness; 2-gel system includes 5 combs, 5 sets of glass plates, casting stand, 2 casting frames, sample loading guide, electrode assembly, tank, lid with power cables, mini cell buffer dam | |
| 165-8004 | Mini-PROTEAN Tetra Cell for Mini Precast Gels , 4-gel system includes electrode assembly, clamping frame, companion running module, tank, lid with power cables, mini cell buffer dam | |
| 165-8005* | Mini-PROTEAN Tetra Cell for Mini Precast Gels , 2-gel system includes electrode assembly, clamping frame, tank, lid with power cables, mini cell buffer dam | |
| 165-8006 | Mini-PROTEAN Tetra Cell , 10-well, 1.5 mm thickness; 4-gel system includes 5 combs, 5 sets of glass plates, 2 casting stands, 4 casting frames, sample loading guide, electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam | |
| 165-8007* | Mini-PROTEAN Tetra Cell , 10-well, 1.5 mm thickness; 2-gel system includes 5 combs, 5 sets of glass plates, casting stand, 2 casting frames, sample loading guide, electrode assembly, tank, lid with power cables, mini cell buffer dam | |

Mini-PROTEAN Tetra Systems

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 165-8025 | Mini-PROTEAN Tetra Cell and PowerPac Basic Power Supply , includes 165-8001 and 164-5050 |
| 165-8026 | Mini-PROTEAN Tetra Cell and PowerPac Universal Power Supply , includes 165-8001 and 164-5070 |
| 165-8027 | Mini-PROTEAN Tetra Cell and PowerPac HC Power Supply , includes 165-8001 and 164-5052 |
| 165-8028 | Mini-PROTEAN Tetra Cell and PowerPac HV Power Supply , includes 165-8001 and 164-5056 |
| 165-8029 | Mini-PROTEAN Tetra Cell and Mini Trans-Blot Module , includes 165-8001 and 170-3935 |
| 165-8030 | Mini-PROTEAN Tetra Cell for Mini Precast Gels and Mini Trans-Blot Module , includes 165-8004 and 170-3935 |
| 165-8033 | Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes 165-8001, 170-3935, and 164-5050 |
| 165-8034 | Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes 165-8004, 170-3935, and 164-5050 |
| 165-8035 | Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes 165-8001, 170-3935, and 164-5052 |
| 165-8036 | Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes 165-8004, 170-3935, and 164-5052 |

| Description | 0.75 mm | 1.0 mm | 1.5 mm |
|--------------------------|----------|----------|----------|
| Casting Modules** | | | |
| 5-Well | 165-8008 | 165-8013 | 165-8019 |
| 9-Well | 165-8009 | 165-8014 | 165-8020 |
| 10-Well | 165-8010 | 165-8015 | 165-8021 |
| 15-Well | 165-8011 | 165-8016 | 165-8022 |
| Prep/2-D Well | 165-8012 | 165-8017 | 165-8023 |
| IPG Well | — | 165-8018 | 165-8024 |

Mini-PROTEAN Combs (5)

| | | | |
|---------------|----------|----------|----------|
| 5-Well | 165-3352 | 165-3357 | 165-3363 |
| 9-Well | 165-3353 | 165-3358 | 165-3364 |
| 10-Well | 165-3354 | 165-3359 | 165-3365 |
| 15-Well | 165-3355 | 165-3360 | 165-3366 |
| Prep/2-D Well | 165-3356 | 165-3361 | 165-3367 |
| IPG Well | — | 165-3362 | 165-3368 |

Catalog # Description

Hand Cast Gel Accessories and Replacement Parts

| | |
|----------|---------------------------------------------------------------------------------------------------------------------------------|
| 165-8051 | Mini-PROTEAN Tetra Cell Casting Stand , 2 core, includes clamps for use with the Mini-PROTEAN Tetra cell casting modules |
| 165-8052 | Mini-PROTEAN Tetra Cell Casting Stand , 1 core, includes clamps for use with the Mini-PROTEAN Tetra cell casting modules |
| 165-3303 | Mini-PROTEAN Casting Stand |
| 165-3304 | Mini-PROTEAN Casting Frame |
| 165-3305 | Mini-PROTEAN Casting Stand Gaskets , replacement, 2 |
| 165-3308 | Short Plates , 5 |
| 165-3309 | Spacer Plates with 0.5 mm Integrated Spacers , 5 |
| 165-3310 | Spacer Plates with 0.75 mm Integrated Spacers , 5 |

continues

Catalog # Description

Hand Cast Gel Accessories and Replacement Parts (cont.)

| | |
|----------|-------------------------------------------------|
| 165-3311 | Spacer Plates with 1.0 mm Integrated Spacers, 5 |
| 165-3312 | Spacer Plates with 1.5 mm Integrated Spacers, 5 |

Other Replacement Parts and Accessories

| | |
|----------|-------------------------------------------------------------------|
| 165-8037 | Mini-PROTEAN Tetra Electrode Assembly |
| 165-8038 | Mini-PROTEAN Tetra Companion Running Module |
| 165-8039 | Buffer Tank, replacement |
| 165-8040 | Buffer Tank and Lid, replacement |
| 165-8041 | Cell Lid with Power Cables |
| 165-3201 | Sample Loading Guide, 9-well (red) |
| 165-3146 | Sample Loading Guide, 10-well (yellow) |
| 165-3203 | Sample Loading Guide, 12-well (green) |
| 165-3132 | Sample Loading Guide, 15-well (blue) |
| 165-3130 | Mini Cell Buffer Dams, 2 |
| 165-3149 | Replacement Gaskets, for electrophoresis clamping frame, green, 2 |
| 165-3320 | Gel Releasers, 5 |
| 165-3306 | Mini-PROTEAN 3 Clamping Frame |
| 165-3370 | Replacement Wing Clamp |

* The 2-gel systems do not include the companion running module.

** Each casting module includes 2 casting stands, 4 casting frames, 5 combs, 5 sets of plates, and the appropriate sample loading guide.

Mini-PROTEAN 3 Dodeca Cell

Pg 156







| | |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 165-4100 | Mini-PROTEAN 3 Dodeca Cell, includes electrophoresis tank with built-in cooling coil, lid with power cables, 6 electrophoresis clamping frames, 2 buffer dams, drain line, 2 gel releasers |
| 165-4101 | Mini-PROTEAN 3 Dodeca Cell with Multi-Casting Chamber, same as 165-4100 with multi-casting chamber, 15 separation sheets, 8 acrylic blocks, tapered luer connector, stopcock valve |
| 165-5132 | Mini-PROTEAN 3 Dodeca Cell and 6-Row AnyGel Stand, includes 165-4100 and 165-5131 |

Replacement Parts and Accessories

| | |
|----------|-----------------------------------------------------------------------------------------|
| 165-4102 | Replacement Electrophoresis Clamping Frame |
| 165-3149 | Replacement Gaskets, for electrophoresis clamping frame, green, 2 |
| 165-4103 | Lower Electrode Assembly with Platinum Wire |
| 165-4104 | Replacement Drain Line |
| 165-4105 | Replacement Cooling Coil, includes connector tubing |
| 165-2948 | Replacement Power Cables, for lid |
| 165-3320 | Gel Releasers, 5 |
| 165-3130 | Mini Cell Buffer Dams, 2 |
| 165-5131 | AnyGel Stand, 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Ready Gel mini gels |

Mini-PROTEAN TGX Precast Gels*

Pg 157

| Description |  8+1-Well 30 µl |  10-Well 30 µl |  10-Well 50 µl |  12-Well 20 µl |  15-Well 15 µl |  IPG Well 7 cm IPG Strip |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Mini-PROTEAN TGX Precast Gels | | | | | | |
| 7.5% Resolving Gel | 456-1029 | 456-1023 | 456-1024 | 456-1025 | 456-1026 | 456-1021 |
| 10% Resolving Gel | 456-1039 | 456-1033 | 456-1034 | 456-1035 | 456-1036 | 456-1031 |
| 12% Resolving Gel | 456-1049 | 456-1043 | 456-1044 | 456-1045 | 456-1046 | 456-1041 |
| 18% Resolving Gel | 456-1079 | 456-1073 | 456-1074 | 456-1075 | 456-1076 | 456-1071 |
| 4-15% Resolving Gel | 456-1089 | 456-1083 | 456-1084 | 456-1085 | 456-1086 | 456-1081 |
| 4-20% Resolving Gel | 456-1099 | 456-1093 | 456-1094 | 456-1095 | 456-1096 | 456-1091 |
| 8-16% Resolving Gel | 456-1109 | 456-1103 | 456-1104 | 456-1105 | 456-1106 | 456-1101 |
| 10-20% Resolving Gel | 456-1119 | 456-1113 | 456-1114 | 456-1115 | 456-1116 | 456-1111 |
| Any kD Resolving Gel | 456-9039 | 456-9033 | 456-9034 | 456-9035 | 456-9036 | 456-9031 |
| Mini-PROTEAN TGX Stain Free Precast Gels | | | | | | |
| 7.5% Resolving Gel | 456-8029 | 456-8023 | 456-8024 | 456-8025 | 456-8026 | 456-8021 |
| 10% Resolving Gel | 456-8039 | 456-8033 | 456-8034 | 456-8035 | 456-8036 | 456-8031 |
| 12% Resolving Gel | 456-8049 | 456-8043 | 456-8044 | 456-8045 | 456-8046 | 456-8041 |
| 4-15% Resolving Gel | 456-8089 | 456-8083 | 456-8084 | 456-8085 | 456-8086 | 456-8081 |
| 4-20% Resolving Gel | 456-8099 | 456-8093 | 456-8094 | 456-8095 | 456-8096 | 456-8091 |
| 8-16% Resolving Gel | 456-8109 | 456-8103 | 456-8104 | 456-8105 | 456-8106 | 456-8101 |
| Any kD Resolving Gel | 456-8129 | 456-8123 | 456-8124 | 456-8125 | 456-8126 | 456-8121 |

Empty Cassettes

| | | | | | | |
|-------------------------------|---|----------|---|---|----------|----------|
| Mini-PROTEAN Empty Cassette** | — | 456-0003 | — | — | 456-0006 | 456-0001 |
|-------------------------------|---|----------|---|---|----------|----------|

* 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 10 empty cassettes and 10 combs.

Ordering Information

Vertical Electrophoresis

www.bio-rad.com

Catalog # Description

Premixed Buffers for Mini-PROTEAN TGX Gels*

| | |
|----------|------------------------------|
| 161-0737 | Laemmli Sample Buffer, 30 ml |
| 161-0738 | Native Sample Buffer, 30 ml |
| 161-0732 | 10x Tris/Glycine/SDS, 1L |
| 161-0734 | 10x Tris/Glycine, 1L |






* For 5 L volume of the running buffers, see page 147.

Applications Guide

165-8100 Mini-PROTEAN Gel Instruction Manual and Application Guide, available upon request or online

Mini-PROTEAN Precast Gels

Pg 157








| Description |  10-Well 30 µl |  10-Well 50 µl |  12-Well* 20 µl |  15-Well 15 µl |  IPG Well 7 cm IPG Strip |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Mini-PROTEAN Precast Gels (2 per package) | | | | | |
| 5% TBE | 456-5013 | 456-5014** | 456-5015** | 456-5016 | — |
| 10% TBE | 456-5033 | 456-5034** | 456-5035 | 456-5036 | — |
| 15% TBE | 456-5053** | 456-5054 | 456-5055** | 456-5056 | — |
| 4–20% TBE | 456-5093** | 456-5094** | 456-5095** | 456-5096** | — |
| 10% TBE-Urea | 456-6033** | — | — | 456-6036** | — |
| 15% TBE-Urea | 456-6053** | — | 456-6055** | 456-6056** | — |
| 16.5% Tris-Tricine | 456-3063 | 456-3064 | 456-3065** | 456-3066 | — |
| 10–20% Tris-Tricine | 456-3113 | 456-3114 | 456-3115** | 456-3116** | — |
| 7% Tris-Acetate | 456-9023 | 456-9024 | — | 456-9026 | — |
| 3–8% Tris-Acetate | 456-9133 | 456-9134 | — | 456-9136 | 456-9131 |
| 10% Zymogram with Gelatin | 456-7033 | 456-7034 | 456-7035** | 456-7036** | — |
| 12% Zymogram with Casein | 456-7043** | 456-7044** | — | — | — |
| IEF, pH 3–10 | 456-4213 | 456-4214** | — | 456-4216** | — |
| IEF, pH 5–8 | 456-4223** | — | — | — | — |

* Multichannel–pipet compatible.

** Please allow up to 2 weeks for delivery.

Ready Gel Precast Gels

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| Description |  10-Well 30 µl |  15-Well 15 µl |  Prep+1 Well 450 µl |  10-Well 50 µl |  12-Well* 20 µl |  9-Well* 30 µl |  IPG Well 7 cm IPG Strip |
|--------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Ready Gel Tris-HCl Gels | | | | | | | |
| 5% Resolving Gel | 161-1210 | 161-1211** | — | 161-1213 | 161-1214** | — | — |
| 7.5% Resolving Gel | 161-1100 | 161-1118 | 161-1136** | 161-1154 | 161-1172 | — | — |
| 10% Resolving Gel | 161-1101 | 161-1119 | 161-1137 | 161-1155 | 161-1173 | 161-1191** | 161-1390** |
| 12% Resolving Gel | 161-1102 | 161-1120 | 161-1138 | 161-1156 | 161-1174 | — | 161-1391 |
| 15% Resolving Gel | 161-1103 | 161-1121 | 161-1139** | 161-1157 | 161-1175 | — | — |
| 18% Resolving Gel | 161-1216 | 161-1217** | — | 161-1219 | 161-1220** | — | — |
| 4–15% Linear Gradient | 161-1104 | 161-1122 | 161-1140 | 161-1158 | 161-1176 | 161-1194** | 161-1392** |
| 4–20% Linear Gradient | 161-1105 | 161-1123 | 161-1141 | 161-1159 | 161-1177 | — | 161-1393** |
| 8–16% Linear Gradient | 161-1222 | 161-1223 | — | 161-1225 | 161-1226 | — | 161-1394 |
| 10–20% Linear Gradient | 161-1106 | 161-1124 | 161-1142** | 161-1160 | 161-1178 | — | 161-1395** |
| Ready Gel IEF Gels | | | | | | | |
| pH 3–10 | 161-1111 | 161-1129** | — | 161-1165** | — | — | — |
| pH 5–8 | 161-1112** | — | — | — | — | — | — |
| Ready Gel Zymogram Gels | | | | | | | |
| 10% Zymogram Gel with Gelatin | 161-1113 | 161-1131** | — | 161-1167 | 161-1185** | — | — |
| 12% Zymogram Gel with Casein | 161-1114** | — | — | 161-1168** | — | — | — |
| Ready Gel TBE-Urea Gels | | | | | | | |
| 5% TBE-Urea Gel | 161-1115** | 161-1133** | — | — | — | — | — |

| Catalog # | Description |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| Premixed Buffers for Tris-HCl Gels | |
| 161-0737 | 1x Laemmli Sample Buffer, 30 ml |
| 161-0738 | 1x Native Sample Buffer, 30 ml |
| 161-0732 | 10x Tris/Glycine/SDS, 1 L |
| 161-0734 | 10x Tris/Glycine, 1 L |
| 161-0772 | 10x Tris/Glycine/SDS, 5 L cube |
| 161-0771 | 10x Tris/Glycine, 5 L cube |
| Premixed Buffers for Tris-Tricine Gels for Peptides | |
| 161-0739 | 1x Tricine Sample Buffer, 30 ml |
| 161-0744 | 10x Tris/Tricine/SDS, 1 L |
| Premixed Buffers for IEF Gels | |
| 161-0763 | 1x IEF Sample Buffer, 30 ml |
| 161-0761 | 10x IEF Anode Buffer, 250 ml |
| 161-0762 | 10x IEF Cathode Buffer, 250 ml |
| Premixed Buffers for Zymogram Gels | |
| 161-0764 | 1x Zymogram Sample Buffer, 30 ml |
| 161-0765 | 10x Zymogram Renaturation Buffer, 125 ml |
| 161-0766 | 10x Zymogram Development Buffer, 125 ml |
| Premixed Buffers for TBE and TBE-Urea Gels | |
| 161-0767 | 5x Nucleic Acid Sample Loading Buffer, 10 ml |
| 161-0768 | 1x TBE-Urea Sample Buffer, 30 ml |
| 161-0770 | 10x Tris/Boric Acid/EDTA (TBE), 5 L cube |
| Accessories | |
| 161-0993 | Ready Gel System Resource Guide, free upon request with Ready Gel purchase |
| 161-0992 | Ready Gel Key Knife, free upon request with Ready Gel purchase |

* Multichannel-pipet compatible.

** Please allow up to 2 weeks for delivery.

Mini-PROTEAN Hand Casting Accessories

Pg 159

Mini-PROTEAN Empty Cassettes

| | |
|----------|----------------------------------------|
| 456-0003 | Mini-PROTEAN Empty Cassettes, 10-well |
| 456-0006 | Mini-PROTEAN Empty Cassettes, 15-well |
| 456-0001 | Mini-PROTEAN Empty Cassettes, IPG-well |

Ready Gel Empty Cassettes and Combs

| | |
|----------|-------------------------------------|
| 161-0990 | Ready Gel Empty Cassettes, 10 |
| 161-0991 | Ready Gel Combs, IPG 10 |
| 161-0999 | Ready Gel Combs, 9-well, 10 |
| 161-0997 | Ready Gel Combs, 50 µl, 10-well, 10 |
| 161-0996 | Ready Gel Combs, 2-D/prep-well, 10 |
| 161-0995 | Ready Gel Combs, 15-well, 10 |
| 161-0998 | Ready Gel Combs, 12-well, 10 |
| 161-0994 | Ready Gel Combs, 10-well, 10 |

AnyGel Stands and Accessories

| | |
|----------|----------------------------------------------------------------------------------------------|
| 165-4131 | AnyGel Stand, single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN mini gels |
| 165-5131 | AnyGel Stand, 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Mini-PROTEAN mini gels |
| 165-4132 | Replacement Clamps, 2 |

AnyGel Stands and Electrophoresis Cells

| | |
|----------|------------------------------------------------------------------------------------------------------|
| 165-5134 | PROTEAN Plus Dodeca Cell (100/120 V) and Two 6-Row AnyGel Stands, includes 165-4150 and two 165-5131 |
| 165-5135 | PROTEAN Plus Dodeca Cell (220/240 V) and Two 6-Row AnyGel Stands, includes 165-4151 and two 165-5131 |
| 165-5133 | Criterion Dodeca Cell and 6-Row AnyGel Stand, includes 165-4130 and 165-5131 |
| 165-6020 | Criterion Cell and Single-Row AnyGel Stand, includes 165-6001 and 165-4131 |

Ordering Information

Vertical Electrophoresis

www.bio-rad.com

| Catalog # | Description |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mini-PROTEAN 3 Multi-Casting Chambers | |
| 165-4110 | Mini-PROTEAN 3 Multi-Casting Chamber , includes 15 separation sheets, 8 acrylic blocks, tapered luer connector, stopcock valve (order glass plates and combs separately) |
| 165-4111* | Mini-PROTEAN 3 Multi-Casting Chamber , 0.75 mm, includes 15 sets of glass plates |
| 165-4112* | Mini-PROTEAN 3 Multi-Casting Chamber , 1.0 mm, includes 15 sets of glass plates |
| 165-4113* | Mini-PROTEAN 3 Multi-Casting Chamber , 1.5 mm, includes 15 sets of glass plates |
| 165-4116* | Mini-PROTEAN 3 Multi-Casting Chamber , 0.5 mm, includes 15 sets of glass plates |
| * Order combs separately. | |
| Mini-PROTEAN 3 Multi-Casting Chamber Accessories | |
| 165-4114 | Acrylic Blocks , 6 mm, 8 |
| 165-4115 | Separation Sheets , 15 |
| 165-3320 | Gel Releasers , 5 |
| 165-2913 | Replacement Gaskets , for Mini-PROTEAN 3 multi-casting chamber, includes 3' of tubing |
| Combs** and Glass Plates for 2-D Electrophoresis | |
| 165-3308 | Short Plates , 5 |
| 165-3310 | Spacer Plates with 0.75 mm Integrated Spacers , 5 |
| 165-3311 | Spacer Plates with 1.0 mm Integrated Spacers , 5 |
| 165-3312 | Spacer Plates with 1.5 mm Integrated Spacers , 5 |
| 165-3362 | Mini-PROTEAN Comb , IPG well, 1.0 mm |
| 165-3368 | Mini-PROTEAN Comb , IPG well, 1.5 mm |
| 165-3356 | Mini-PROTEAN Comb , prep/2-D well, 0.75 mm |
| 165-3361 | Mini-PROTEAN Comb , prep/2-D well, 1.0 mm |
| 165-3367 | Mini-PROTEAN Comb , prep/2-D well, 1.5 mm |
| Model 485 Gradient Former | |
| 165-4120 | Model 485 Gradient Former , 40–175 ml, includes body with valve stem and tubing connection kit |
| 165-4122 | Model 485 Gradient Former and Mini-PROTEAN 3 Multi-Casting Chamber , includes 165-4120 and 165-4110 |
| Model 485 Gradient Former Accessories | |
| 165-2006 | Exponential Piston , for Model 385 and Model 485 gradient formers |
| 165-2007 | Gradient Pouring Needles , 2 |
| 165-2008 | Tubing Connection Kit , includes stopcock, luer taper coupling, tubing (1/8" ID, 3'), Y-connector |
| * Order combs separately. | |
| ** For multi-well comb configurations, refer to page 168. | |

Midi-Format Vertical Electrophoresis

| Catalog # | Description | |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Criterion Cell | | Pg 160 |
| Criterion Cell and Systems | | |
| 165-6001 | Criterion Cell , includes electrophoresis buffer tank, lid with power cables, 3 sample loading guides (12+2 well, 18-well, 26-well) | |
| 165-6019 | Criterion Cell and PowerPac Basic Power Supply , 100–120/220–240 V, includes 165-6001 and 164-5050 | |
| 165-6020 | Criterion Cell and Single-Row AnyGel Stand , includes 165-6001 and 165-4131 | |
| Criterion Cell and Blotter Systems | | |
| 165-6024 | Criterion Cell/Plate Blotter System , includes 165-6001 and 170-4070 | |
| 165-6025 | Criterion Cell/Wire Blotter System , includes 165-6001 and 170-4071 | |
| Replacement Parts | | |
| 165-6002 | Criterion Replacement Electrophoresis Buffer Tank , with lower electrodes | |
| 165-6003 | Criterion Replacement Lid , with upper electrodes | |
| 165-6004 | Criterion Replacement Upper Electrode , includes prestrung platinum wire | |
| 165-6005 | Criterion Replacement Lower Electrode , includes prestrung platinum wire | |
| 165-2948 | Replacement Power Cables , for lid | |
| 165-4131 | AnyGel Stand , single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Ready Gel mini gels | |
| Criterion Dodeca Cell | | Pg 160 |
| 165-4130 | Criterion Dodeca Cell , includes electrophoresis buffer tank with built-in cooling coil, lid with power cables | |
| 165-4138 | Criterion Dodeca Cell and PowerPac HC Power Supply , includes 165-4130 and 164-5052 | |
| 165-4139 | Criterion Dodeca Cell and PowerPac Universal Power Supply , includes 165-4130 and 164-5070 | |
| 165-5133 | Criterion Dodeca Cell and 6-Row AnyGel Stand , includes 165-4130 and 165-5131 | |






Catalog # Description

Replacement Parts

| | |
|----------|-----------------------------------------------------|
| 165-4104 | Replacement Drain Line |
| 165-4135 | Lower Electrode with Platinum Wire |
| 165-4136 | Replacement Cooling Coil, includes connector tubing |
| 165-4137 | Replacement Lid |
| 165-2948 | Replacement Power Cables, for lid |

Criterion Precast Gels

Pg 161

| Description |  12+2 Well*, ** 45 µl |  18-Well 30 µl |  26-Well* 15 µl |  Prep+2 Well** 800 µl |  IPG+1 Well** 11 cm IPG Strip |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Criterion TGX Precast Gels | | | | | |
| 7.5% Resolving Gel | 567-1023 | 567-1024 | 567-1025 | 567-1022 | 567-1021 |
| 10% Resolving Gel | 567-1033 | 567-1034 | 567-1035 | 567-1032 | 567-1031 |
| 12% Resolving Gel | 567-1043 | 567-1044 | 567-1045 | 567-1042 | 567-1041 |
| 18% Resolving Gel | 567-1073 | 567-1074 | 567-1075 | 567-1072 | 567-1071 |
| 4–15% Linear Gradient | 567-1083 | 567-1084 | 567-1085 | 567-1082 | 567-1081 |
| 4–20% Linear Gradient | 567-1093 | 567-1094 | 567-1095 | 567-1092 | 567-1091 |
| 8–16% Linear Gradient | 567-1103 | 567-1104 | 567-1105 | 567-1102 | 567-1101 |
| 10–20% Linear Gradient | 567-1113 | 567-1114 | 567-1115 | 567-1112 | 567-1111 |
| Any kD Gel | 567-1123 | 567-1124 | 567-1125 | 567-1122 | 567-1121 |
| Criterion TGX Stain-Free Precast Gels | | | | | |
| 7.5% Gel | 567-8023 | 567-8024 | 567-8025 | 567-8022 | 567-8021 |
| 10% Gel | 567-8033 | 567-8034 | 567-8035 | 567-8032 | 567-8031 |
| 12% Gel | 567-8043 | 567-8044 | 567-8045 | 567-8042 | 567-8041 |
| 18% Gel | 567-8073 | 567-8074 | 567-8075 | 567-8072 | 567-8071 |
| 4–15% Gel | 567-8083 | 567-8084 | 567-8085 | 567-8082 | 567-8081 |
| 4–20% Gel | 567-8093 | 567-8094 | 567-8095 | 567-8092 | 567-8091 |
| 8–16% Linear Gradient | 567-8103 | 567-8104 | 567-8105 | 567-8102 | 567-8101 |
| 10–20% Linear Gradient | 567-8113 | 567-8114 | 567-8115 | 567-8112 | 567-8111 |
| Any kD Gel | 567-8123 | 567-8124 | 567-8125 | 567-8122 | 567-8121 |
| * Multichannel pipet compatible. ** Includes reference well(s). | | | | | |
| Criterion XT Bis-Tris Gels*** | | | | | |
| 10% Resolving Gel | 345-0111 | 345-0112 | 345-0113 | — | 345-0115 |
| 12% Resolving Gel | 345-0117 | 345-0118 | 345-0119 | 345-0120† | 345-0121 |
| 4–12% Resolving Gel | 345-0123 | 345-0124 | 345-0125 | 345-0126† | 345-0127 |
| Criterion XT Tris-Acetate Gels | | | | | |
| 7% Resolving Gel | 345-0135 | 345-0136† | 345-0137† | — | — |
| 3–8% Resolving Gel | 345-0129 | 345-0130 | 345-0131 | — | 345-0133† |
| Criterion Tris-HCl Gels | | | | | |
| 5% Resolving Gel | 345-0001 | 345-0002 | 345-0003† | — | — |
| 7.5% Resolving Gel | 345-0005 | 345-0006 | 345-0007 | 345-0008 | — |
| 10% Resolving Gel | 345-0009 | 345-0010 | 345-0011 | 345-0012† | 345-0101 |
| 12.5% Resolving Gel | 345-0014 | 345-0015 | 345-0016 | 345-0017† | 345-0102 |
| 15% Resolving Gel | 345-0019 | 345-0020 | 345-0021 | 345-0022† | — |
| 18% Resolving Gel | 345-0023 | 345-0024 | 345-0025 | 345-0026† | — |
| 4–15% Linear Gradient | 345-0027 | 345-0028 | 345-0029 | 345-0030† | 345-0103 |
| 4–20% Linear Gradient | 345-0032 | 345-0033 | 345-0034 | 345-0035 | 345-0104 |
| 8–16% Linear Gradient | 345-0037 | 345-0038 | 345-0039 | 345-0040† | 345-0105 |
| 10–20% Linear Gradient | 345-0042 | 345-0043 | 345-0044 | 345-0045† | 345-0107 |
| 10.5–14% Linear Gradient | 345-9949 | 345-9950 | 345-9951 | — | 345-0106 |
| Criterion Stain Free Gels | | | | | |
| 10% Tris-HCl Gel | 345-1012 | 345-1018 | — | — | — |
| 4–20% Tris-HCL Gel | 345-0412 | 345-0418 | 345-0426 | — | — |
| 8–16% Tris-HCL Gel | 345-8162 | — | 345-8166 | — | 345-8161 |
| Criterion Tris-Tricine Gels | | | | | |
| 16.5% Tris-Tricine | 345-0063 | 345-0064 | 345-0065† | 345-0066† | — |
| 10–20% Tris-Tricine | 345-0067 | 345-0068 | 345-0069 | — | — |
| Criterion IEF Gels | | | | | |
| pH 3–10 | 345-0071† | 345-0072† | 345-0073† | — | — |
| pH 5–8 | — | 345-0076† | — | — | — |
| Criterion Zymogram Gels | | | | | |
| 10% Zymogram Gel with Gelatin | 345-0079† | 345-0080† | 345-0081† | — | — |
| 12.5% Zymogram Gel with Casein | 345-0082† | 345-0083† | 345-0084† | — | — |

Ordering Information

Vertical Electrophoresis

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| Description | 12+2 Well*, ** 45 µl | 18-Well 30 µl | 26-Well* 15 µl | Prep+2 Well** 800 µl | IPG+1 Well** 11 cm IPG Strip |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|-------------------------|---------------------------------|
| Criterion TBE Gels | | | | | |
| 5% TBE Gel | 345-0047 | 345-0048 | 345-0049 | — | — |
| 10% TBE Gel | 345-0051 | 345-0052 | 345-0053 | — | — |
| 15% TBE Gel | 345-0055† | 345-0056 | 345-0057 | — | — |
| 4–20% TBE Gel | 345-0059† | 345-0060† | 345-0061† | — | — |
| Criterion TBE-Urea Gels | | | | | |
| 5% TBE-Urea Gel | 345-0086† | — | — | — | — |
| 10% TBE-Urea Gel | 345-0088† | 345-0089† | 345-0090† | — | — |
| 15% TBE-Urea Gel | 345-0091 | 345-0092 | 345-0093† | — | — |
| Criterion Empty Cassettes | | | | | |
| 1.0 mm thick, 10 sets | 345-9901 | 345-9902 | 345-9903 | 345-9904 | 345-9906 |
| Loading Guides | | | | | |
| Criterion Sample Loading Guide†† | 165-6006 | 165-6007 | 165-6008 | — | — |
| Catalog # | Description | | | | |
| Criterion XT Buffers and Reagents | | | | | |
| 161-0788*** | XT MOPS Running Buffer, 20x, 500 ml | | | | |
| 161-0789*** | XT MES Running Buffer, 20x, 500 ml | | | | |
| 161-0790 | XT Tricine Running Buffer, 20x, 500 ml | | | | |
| 161-0791 | XT Sample Buffer, 4x, 10 ml | | | | |
| 161-0792 | XT Reducing Agent, 20x, 1 ml | | | | |
| 161-0793*** | XT MOPS Buffer Kit, includes 500 ml of 20x XT MOPS running buffer, 10 ml of 4x XT sample buffer, 1 ml of 20x XT reducing agent | | | | |
| 161-0796*** | XT MES Buffer Kit, includes 500 ml of 20x XT MES running buffer, 10 ml of 4x XT sample buffer, 1 ml of 20x XT reducing agent | | | | |
| 161-0797 | XT Tricine Buffer Kit, includes 500 ml of 20x XT Tricine running buffer, 10 ml of 4x XT sample buffer, 1 ml of 20x XT reducing agent | | | | |

Application Guide

345-0000 Criterion Precast Gel Application Guide, free upon request with Criterion gel purchase

Criterion Accessories

Pg 163

AnyGel Stands and Accessories

165-4131 AnyGel Stand, single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Ready Gel mini gels
 165-5131 AnyGel Stand, 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Ready Gel mini gels
 165-4132 Replacement Clamps, 2

Criterion Staining Trays

345-9921 Criterion Staining/Blotting Trays, with lids, 2
 345-9920 Criterion Staining/Blotting Trays, with lids, 12

Dodeca Stainers, Accessories, and Replacement Parts

165-3400 Dodeca Stainer, large, 100–240 V, includes 13 trays (12 clear, 1 white), 12 tray attachments, shaking rack, solution tank, lid with shaker motor, shaker control unit, gel clip
 165-3401 Dodeca Stainer, small, 100–240 V, includes 13 trays (12 clear, 1 white), 12 Criterion tray attachments, shaking rack, solution tank, lid with shaker motor, shaker control unit, gel clip
 165-3403 Dodeca Stainer and Dodeca Silver Stain Kit, large, 100–240 V, includes large Dodeca stainer (165-3400), Dodeca silver stain kit for the large tank (161-0480)
 165-3404 Dodeca Stainer and Dodeca Silver Stain Kit, small, 100–240 V, includes small Dodeca stainer (165-3401), Dodeca silver stain kit for the small tank (161-0481)
 165-3405 Dodeca Stainer and Bio-Safe Coomassie Stain Kit, large, 100–240 V, includes large Dodeca stainer (165-3400) and staining solution for a large tank, sufficient for up to 12 large format gels
 165-3406 Dodeca Stainer and Bio-Safe Coomassie Stain Kit, small, 100–240 V, includes small Dodeca stainer (165-3401) and staining solution for a small tank, sufficient for up to 12 large format gels
 165-3407 Dodeca Stainer and SYPRO Ruby Protein Gel Stain Kit, large, 100–240 V, includes large Dodeca stainer (165-3400) and SYPRO staining solution for a large tank, sufficient for up to 12 large format gels
 165-3408 Dodeca Stainer and SYPRO Ruby Protein Gel Stain Kit, small, 100–240 V, includes small Dodeca stainer (165-3401) and SYPRO staining solution for a small tank, sufficient for up to 12 large format gels
 165-3414 Gel Clip, holds any gel size
 165-3429 Storage Box, large, holds up to 4 gels on large staining trays
 165-3430 Storage Box, small, holds up to 4 gels on small staining trays
 165-3415 Dodeca Stainer Tray, large, replacement, 2
 165-3416 Dodeca Stainer Tray, small, replacement, 2
 165-3417 Dodeca Stainer Tray Attachment, large, fits on large trays, required for PROTEAN Plus 25 cm handcast gels, 2
 165-3418 Dodeca Stainer Criterion Tray Attachment, fits on small trays, required for Criterion gels, 2
 165-3419 Dodeca Stainer White Development Tray, large

continues

| Catalog # | Description |
|-----------|-------------|
|-----------|-------------|

Dodeca Stainers, Accessories, and Replacement Parts (cont.)

| | |
|----------|------------------------------------------------------------------------------------|
| 165-3420 | Dodeca Stainer White Development Tray, small |
| 165-3421 | Dodeca Stainer Shaking Rack, large, replacement |
| 165-3422 | Dodeca Stainer Shaking Rack, small, replacement |
| 165-3423 | Dodeca Stainer Solution Tank, large, replacement |
| 165-3424 | Dodeca Stainer Solution Tank, small, replacement |
| 165-3425 | Dodeca Stainer Lid with Shaker Motor, 100–240 V, replacement, fits both tank sizes |
| 165-3426 | Dodeca Stainer Lid without Shaker Motor, replacement, fits both tank sizes |
| 165-3427 | Dodeca Stainer Shaker Motor, 100–240 V, replacement |
| 165-3428 | Dodeca Stainer Shaker Control Unit, replacement |

Large-Format Vertical Electrophoresis**PROTEAN II xi and XL Cells****Pg 164****PROTEAN II xi Cells,* for 16 x 16 cm and 16 x 20 cm Gel Sizes**

| | |
|----------|-------------------------------------------------------------------|
| 165-1801 | PROTEAN II xi Cell, 16 cm, without spacers and combs |
| 165-1802 | PROTEAN II xi Cell, 16 cm, 1.5 mm spacers (4), 15-well combs (2) |
| 165-1803 | PROTEAN II xi Cell, 16 cm, 1.0 mm spacers (4), 15-well combs (2) |
| 165-1804 | PROTEAN II xi Cell, 16 cm, 0.75 mm spacers (4), 15-well combs (2) |
| 165-1811 | PROTEAN II xi Cell, 20 cm, without spacers and combs |
| 165-1812 | PROTEAN II xi Cell, 20 cm, 1.5 mm spacers (4), 15-well combs (2) |
| 165-1813 | PROTEAN II xi Cell, 20 cm, 1.0 mm spacers (4), 15-well combs (2) |
| 165-1814 | PROTEAN II xi Cell, 20 cm, 0.75 mm spacers (4), 15-well combs (2) |

PROTEAN II XL Cells, Wide Format, Compatible with ReadyStrip IPG Strips, for 18.3 x 20 cm Gels

| | |
|----------|--------------------------------------------------------------------------------------------------------------------------------|
| 165-3188 | PROTEAN II XL Cell, wide-format, 1.0 mm, includes PROTEAN II xi basic unit (165-1834) and 1.0 mm IPG conversion kit (165-3183) |
| 165-3189 | PROTEAN II XL Cell, wide-format, 1.5 mm, includes PROTEAN II xi basic unit (165-1834) and 1.5 mm IPG conversion kit (165-3186) |
| 165-3190 | PROTEAN II XL Cell, wide-format, 2.0 mm, includes PROTEAN II xi basic unit (165-1834) and 2.0 mm IPG conversion kit (165-3184) |

PROTEAN II IPG Conversion Kits for 2-D (to Convert xi to XL)

| | |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 165-1815 | PROTEAN II xi Cell 2-D Conversion Kit, converts PROTEAN II xi cell into a tube gel IEF 2-D system, 2 tube gel adaptors, 24 glass tubes (1.5 mm ID, 180 mm length), gaskets, grommets, stoppers |
| 165-3183 | PROTEAN II xi Cell IPG Conversion Kit, 1.0 mm, 18.5 x 20 cm, includes 2 sets of IPG clamps, 2 sets of 20 x 20 cm glass plates, 4 IPG spacers, 2 IPG 2-D combs, 2 IPG central cooling core gaskets, 2 casting stand gaskets, alignment card |
| 165-3186 | PROTEAN II xi Cell IPG Conversion Kit, 1.5 mm, 18.5 x 20 cm |
| 165-3184 | PROTEAN II xi Cell IPG Conversion Kit, 2.0 mm, 18.5 x 20 cm |
| 165-1834 | PROTEAN II xi Basic Unit With Casting Stand, includes central cooling core, lower buffer chamber, lid with cables, leveling bubble; combine with an IPG conversion kit for a complete 18.5 cm wide format system |

PROTEAN II xi and XL Accessories**Pg 165****PROTEAN II xi Accessories for Running Gels**

| | |
|----------|----------------------------------------------------------------|
| 165-1901 | PROTEAN II xi Sandwich Clamps, 16 cm set (1 left, 1 right) |
| 165-1902 | PROTEAN II xi Sandwich Clamps, 20 cm set (1 left, 1 right) |
| 165-1913 | PROTEAN II xi Replacement Gaskets, for central cooling core, 2 |

PROTEAN II XL Accessories for Running Gels

| | |
|----------|----------------------------------------------------------------|
| 165-1835 | PROTEAN II XL Sandwich Clamps, 20 cm set (1 left, 1 right) |
| 165-3182 | PROTEAN II XL Replacement Gaskets, for central cooling core, 2 |

PROTEAN II xi and XL Accessories for Running Gels

| | |
|-------------|---------------------------------------------------------|
| 165-1806 | Central Cooling Core, includes 2 gaskets |
| 165-1807 | Buffer Tank |
| 165-1808 | Cell Lid, with power cables |
| 165-1909 | Upper Buffer Dam |
| 100-5430 | PROTEAN II Latch Assembly Kit, for central cooling core |
| 900-7680-18 | Replacement Platinum Wire, cathode, 18" |
| 900-7680-24 | Replacement Platinum Wire, anode, 24" |

PROTEAN II xi and XL Casting Apparatus

| | |
|----------|-------------------------------------------|
| 165-1911 | Slab Gel Casting Stand, with gaskets |
| 165-1912 | Replacement Gaskets, for casting stand, 2 |

PROTEAN II xi Glass Plates*

| | |
|----------|----------------------------------------------------------------------------|
| 165-1821 | Inner Plates, for 16 cm cell, 16 x 20 cm, 2, for PROTEAN II xi cell only |
| 165-1822 | Outer Plates, for 16 cm cell, 18.3 x 20 cm, 2, for PROTEAN II xi cell only |

Ordering Information

Vertical Electrophoresis

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| Catalog # | Description |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| PROTEAN II xi Specialty Glass Plates | |
| 165-1825** | Frosted Inner Plates , for agarose gels, 16 cm cell, 16 x 20 cm, 2, for PROTEAN II xi cell only |
| 165-1826** | Frosted Inner Plates , for agarose gels, 20 cm cell, 20 x 20 cm, 2, for PROTEAN II xi cell only |
| 165-1832*** | Notched Inner Plate , for double-up procedures, 16 cm cell, 16 cm bevel length, 16 x 20 cm, for PROTEAN II xi cell only |
| 165-1833*** | Notched Inner Plate , for double-up procedures, 20 cm cell, 16 cm bevel length, 20 x 20 cm, for PROTEAN II xi cell only |
| PROTEAN II xi and XL Glass Plates* | |
| 165-1823 | Inner Plates , for 20 cm cell, 20 x 20 cm, 2 |
| 165-1824 | Outer Plates , for 20 cm cell, 22.3 x 20 cm, 2 |

| Description | 0.5 mm | 0.75 mm | 1.0 mm | 1.5 mm | 3.0 mm |
|-----------------------------------------|----------|----------|----------|----------|----------|
| PROTEAN II xi Spacers (Set of 4) | | | | | |
| 16 cm Spacers | 165-1841 | 165-1842 | 165-1843 | 165-1844 | 165-1845 |
| 20 cm Spacers | 165-1846 | 165-1847 | 165-1848 | 165-1849 | 165-1850 |
| PROTEAN II xi Combs† | | | | | |
| Blank | — | 165-1891 | 165-1892 | 165-1893 | 165-1894 |
| 2-D (IPG well) | — | — | 165-1897 | 165-1898 | 165-1899 |
| 3-Well | — | — | — | 165-1888 | — |
| 5-Well | — | — | 165-1882 | 165-1883 | 165-1884 |
| 10-Well | 165-1875 | 165-1876 | 165-1877 | 165-1878 | 165-1879 |
| 15-Well | 165-1870 | 165-1871 | 165-1872 | 165-1873 | 165-1874 |
| 20-Well | 165-1865 | 165-1866 | 165-1867 | 165-1868 | 165-1869 |
| 25-Well | — | 165-1861 | 165-1862 | 165-1863 | — |

| Description | 1.0 mm | 1.5 mm | 2.0 mm |
|----------------------------------------------|----------|----------|----------|
| PROTEAN II XL Combs, IPG Strip Format | | | |
| 2-D (Reference Well) | 165-1838 | 165-3187 | 165-1839 |

| Catalog # | Description |
|-----------------------------------------------------------|-------------------------------|
| PROTEAN II XL Spacers, IPG Strip Format (Set of 4) | |
| 165-1836 | 20 cm Spacers , 1.0 mm |
| 165-3181 | 20 cm Spacers , 1.5 mm |
| 165-1837 | 20 cm Spacers , 2.0 mm |

* One gel sandwich consists of 1 outer plate, 1 inner plate, and 2 spacers.

** Used with regular outer plate.

*** One double-up sandwich (2 gels/side) consists of 1 outer plate, 1 notched inner plate, 1 inner plate, and 4 spacers. Double-ups are not recommended for the second dimension in 2-D electrophoresis.

† 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 (catalog #165-1859).

PROTEAN II xi and XL Multi-Cells

Pg 166

| | |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PROTEAN II xi Multi-Cell* | |
| 165-1951 | PROTEAN II xi Multi-Cell , includes 3 central cooling cores with gaskets, buffer tank, lid with power cables, 1 upper buffer dam, PROTEAN II xi multi-casting chamber with accessories, leveling bubble |
| 165-1956 | PROTEAN II xi Multi-Cell 2-D Conversion Kit , for proper cooling, includes 2 cooling coils and manifold (required for 2-D electrophoresis applications) |
| PROTEAN II XL Multi-Cell, Wide Format, Compatible with ReadyStrip IPG Strips** | |
| 165-3176 | PROTEAN II XL Multi-Cell , wide format, 1.0 mm |
| 165-3177 | PROTEAN II XL Multi-Cell , wide format, 1.5 mm |
| 165-3178 | PROTEAN II XL Multi-Cell , wide format, 2.0 mm |

* The PROTEAN IEF cell is required for first-dimension IEF with the PROTEAN II xi or XL multi-cell; see pages 120–121.

** Includes catalog #165-1951, #165-1956, and 3 PROTEAN II xi cell IPG conversion kits of desired thickness. Order appropriate spacers, plates, clamps, combs, and accessories for your application (pages 175–176).

PROTEAN II Multi-Gel Casting Chambers

Pg 166

| | |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 165-2025 | PROTEAN II xi Multi-Gel Casting Chamber , includes casting chamber, sealing plate, silicone gasket, 15 separation sheets, 4 acrylic blocks, 10 xi alignment cards, tapered luer connector, leveling bubble |
| 165-2024 | PROTEAN II XL Multi-Gel Casting Chamber , includes casting chamber, sealing plate, silicone gasket, 15 separation sheets, 4 acrylic blocks, 10 XL alignment cards, tapered luer connector, leveling bubble |
| Accessories | |
| 165-1957 | Acrylic Blocks , 4 |
| 165-1958 | Separation Sheets , 15 |
| 165-2026 | Sealing Gaskets , 3 |
| 165-2029 | PROTEAN II xi Alignment Cards , 2 |
| 165-1840 | PROTEAN II XL Alignment Cards , 2 |

Catalog # Description

PROTEAN Plus Dodeca Cell

Pg 166

PROTEAN Plus Dodeca Cells and Systems

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 165-4150 | PROTEAN Plus Dodeca Cell , 100/120 V, includes electrophoresis buffer tank with built-in ceramic cooling core, lid, buffer recirculation pump with tubing, 2 gel releasers |
| 165-4140 | PROTEAN Plus Dodeca Cell (100/120 V) and PowerPac HC Power Supply , includes 165-4150 and 164-5052 |
| 165-4142 | PROTEAN Plus Dodeca Cell (100/120 V) and PowerPac Universal Power Supply , includes 165-4150 and 164-5070 |
| 165-4144 | PROTEAN Plus Dodeca Cell (100/120 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply , includes 165-4150, 170-3990, and 164-5070 |
| 165-5134 | PROTEAN Plus Dodeca Cell (100/120 V) and Two 6-Row AnyGel Stands , includes 165-4150 and two 165-5131 |
| 165-4151 | PROTEAN Plus Dodeca Cell , 220/240 V, includes electrophoresis buffer tank with built-in ceramic cooling core, lid, buffer recirculation pump with tubing, 2 gel releasers |
| 165-4141 | PROTEAN Plus Dodeca Cell (220/240 V) and PowerPac HC Power Supply , includes 165-4151 and 164-5052 |
| 165-4143 | PROTEAN Plus Dodeca Cell (220/240 V) and PowerPac Universal Power Supply , includes 165-4151 and 164-5070 |
| 165-4145 | PROTEAN Plus Dodeca Cell (220/240 V), Trans-Blot Plus Cell, and PowerPac Universal Power Supply , includes 165-4151, 170-3990, and 164-5070 |
| 165-5135 | PROTEAN Plus Dodeca Cell (220/240 V) and Two 6-Row AnyGel Stands , includes 165-4151 and two 165-5131 |

Accessories and Replacement Parts

| | |
|----------|----------------------------------------------------------------------------------------------------|
| 165-4158 | Recirculation Pump , 100/120 V |
| 165-4159 | Recirculation Pump , 220/240 V |
| 165-4153 | Replacement Tubing Kit , for tank with stopcock drain port installed at base of tank |
| 165-4152 | Replacement Old Tubing Kit , for tank without stopcock drain port installed at base of tank |
| 165-4154 | Replacement Gasket Assembly |
| 165-4155 | Replacement Electrode Card , anode |
| 165-4156 | Replacement Electrode Card , cathode |
| 165-4157 | Replacement Lid |
| 165-4166 | Manifold Tubing , required for precast gels and PROTEAN II plates, 11 pieces |
| 165-4167 | Buffer Exhaust Tubing |
| 165-3320 | Gel Releasers , 5 |
| 165-2948 | Replacement Power Cables , for lid |

Large-Format Electrophoresis Accessories

Pg 167

PROTEAN Plus Combs

| | |
|----------|-------------------------------------------------------|
| 165-4176 | 2-D Comb with 1 Reference Well , 20 cm, 1.0 mm |
| 165-4177 | 2-D Comb with 1 Reference Well , 20 cm, 1.5 mm |
| 165-4178 | 2-D Comb with 1 Reference Well , 20 cm, 2.0 mm |
| 165-4179 | 2-D Comb with 1 Reference Well , 25 cm, 1.0 mm |
| 165-4180 | 2-D Comb with 1 Reference Well , 25 cm, 1.5 mm |
| 165-4181 | 2-D Comb with 1 Reference Well , 25 cm, 2.0 mm |

PROTEAN Plus Hinged Spacer Plates

| | |
|----------|--------------------------------------------------------------------|
| 165-4170 | Hinged Spacer Plates , for 20 x 20.5 cm gels, 1.0 mm, 1 set |
| 165-4171 | Hinged Spacer Plates , for 20 x 20.5 cm gels, 1.5 mm, 1 set |
| 165-4172 | Hinged Spacer Plates , for 20 x 20.5 cm gels, 2.0 mm, 1 set |
| 165-4173 | Hinged Spacer Plates , for 25 x 20.5 cm gels, 1.0 mm, 1 set |
| 165-4174 | Hinged Spacer Plates , for 25 x 20.5 cm gels, 1.5 mm, 1 set |
| 165-4175 | Hinged Spacer Plates , for 25 x 20.5 cm gels, 2.0 mm, 1 set |

PROTEAN Plus Multi-Casting Chamber

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 165-4160 | PROTEAN Plus Multi-Casting Chamber , includes casting chamber, sealing plate, silicone gasket, tapered luer connector, leveling bubble, 15 separation sheets, 8 acrylic blocks (order glass hinged spacer plates and combs separately) |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Accessories for PROTEAN Plus Multi-Casting Chamber

| | |
|----------|-----------------------------------------------------------------------|
| 165-4165 | Separation Sheets , for PROTEAN Plus multi-casting chamber, 15 |
| 165-4161 | Acrylic Block , 1.5 mm |
| 165-4162 | Acrylic Block , 3 mm |
| 165-4163 | Acrylic Block , 6 mm |
| 165-4164 | Acrylic Block , 12 mm |
| 165-3320 | Gel Releasers , 5 |

Ordering Information

Vertical Electrophoresis

www.bio-rad.com

| Catalog # | Description |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Gel Clip | |
| 165-3414 | Gel Clip , holds any gel size |
| Model 495 Gradient Former | |
| 165-4121 | Model 495 Gradient Former , 100–1,500 ml, includes body with valve stem and tubing connection kit |
| 165-4123 | Model 495 Gradient Former and PROTEAN Plus Multi-Casting Chamber , includes 165-4121 and 165-4160 |
| Accessories for Model 495 Gradient Former | |
| 165-2005 | Exponential Piston , for Model 395 and Model 495 gradient formers |
| 165-2008 | Tubing Connection Kit , includes stopcock, luer taper coupling, tubing (1/8" ID, 3'), Y-connector |
| PROTEAN II xi Plate Washer/Holder | |
| 165-1991* | PROTEAN II xi Plate Washer System , includes 2 plate holders, washing tank, lid, 1 bottle of Bio-Rad cleaning concentrate |
| 165-1992* | PROTEAN II xi Plate Holder |
| 161-0722 | Bio-Rad Cleaning Concentrate , 50x, 1 kg |
| Model 556 Gel Destainer | |
| 165-2010 | Model 556 Gel Destainer , includes outer chamber and lid, 3 slab gel trays, stirbar/sponge support, charcoal sponge |
| Accessories for Model 556 Gel Destainer | |
| 165-2011 | Slab Gel Tray |
| 165-2012 | Tube Gel Tray |
| 165-2013 | Charcoal Sponges , 2 |

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

Detection in Gels

Bio-Rad offers a wide selection of products for a variety of gel detection applications.

Gel Stain Selection Guide

| Stain | Staining per Band | Time | Comments |
|------------------------------------------------------|-------------------|----------|--------------------------------------------------------------------------------------------------------------------------------|
| Coomassie Stains | | | |
| Bio-Safe™ Coomassie G-250 | 8–28 ng | 1–2.5 hr | Nonhazardous staining in aqueous solution; premixed; mass spectrometry-compatible |
| Coomassie Brilliant Blue R-250 | 36–47 ng | 2.5 hr | Simple and consistent; mass spectrometry-compatible |
| Silver Stain | | | |
| Silver Stain Plus™ kit (Gottlieb and Chavko 1987) | 0.6–1.2 ng | 1.5 hr | Simple and robust; mass spectrometry-compatible |
| Fluorescent Stains | | | |
| Oriole™ fluorescent gel stain | 0.5–1 ng | 1.5 hr | Rapid fluorescent gel stain; no destaining; mass spectrometry-compatible; only compatible with UV excitation |
| Flamingo™ fluorescent gel stain | 0.25–0.5 ng | 5 hr | High sensitivity; broad dynamic range; no destaining; simple; mass spectrometry-compatible; excellent for laser-based scanners |
| SYPRO Ruby protein gel stain | 1–10 ng | 3 hr | Fluorescent protein stain; simple, robust protocol; broad dynamic range; mass spectrometry-compatible |
| Nucleic Acid Stains | | | |
| Ethidium bromide | 50 ng | 1 hr | Classic fluorescent DNA stain |

Protein Stains

Bio-Rad offers visible and fluorescent gel stains to accommodate your needs for sensitivity, linearity, and mass spectrometry compatibility.

Coomassie Stains

Order Info: Pg 182

Bio-Safe™ Coomassie Stain

Bio-Safe colloidal Coomassie Brilliant Blue G-250 stain is a premixed, ready-to-use, nonhazardous solution that does not require the use of methanol and acetic acid for destaining. Bio-Safe Coomassie stain produces blue bands on a clear background and is fast, simple, sensitive, and convenient. Advantages include:

- Staining in aqueous solution — no special handling or fume hood requirements
- Visibility of bands while gel is in the stain
- No solvent waste problems or disposal costs

For More Information

Web: www.bio-rad.com/coomassie
Request or download bulletin: 2423



Coomassie Brilliant Blue R-250 Staining and Destaining Solutions

Coomassie Brilliant Blue R-250 staining solution is the fastest and easiest way to stain Criterion™ or other polyacrylamide protein gels using Coomassie stain. Coomassie R-250 staining and destaining solutions are ready to use.

See Also

Precast polyacrylamide gels: pages 157–158, 161–162.
EXQuest spot cutter: page 237.
Imaging systems: pages 232–237.

Silver Stains

Order Info: Pg 182

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 40 mini gels or 13 full-size gels

For More Information

Web: www.bio-rad.com/silverstain

Request or download bulletin: 1089

Specifications

| Time | Number of Gels | Shelf Life | Storage | Lowest Sensitivity |
|--------|----------------|------------|---------|--------------------|
| 1.5 hr | 40 mini gels | 1 yr | 4°C | 0.6–1.2 ng |

See Also

Imaging systems:
pages 232–237.

Precast
polyacrylamide gels:
pages 157–158,
161–162.

Fluorescent Stains

Order Info: Pg 182

Oriole™ Fluorescent Gel Stain

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

- No fixing or destaining required, allowing protocol completion — including imaging — in less than 2 hr
- Full compatibility with downstream proteolysis and mass spectrometric analysis
- Nanogram sensitivity and low background
- Wide dynamic range and highly linear response (3 orders of magnitude)
- Compatible with UV excitation imagers such as the GelDoc™ EZ, ChemiDoc™, and VersaDoc™ MP imaging systems



2-D gel stained with Oriole stain. *E. coli* protein (40 µg) was run on a 11 cm pH 5-8 ReadyStrip™ IPG strip for the first dimension and a Tris-HCl 8-16% Criterion™ gel for the second dimension.

Flamingo™ Fluorescent Gel Stain

This easy-to-use, economical gel stain is for use with laser-based scanners such as the PharosFX™ system, GE's Typhoon systems, and a variety of fluorescence imaging systems.

- 1-D and 2-D electrophoretic applications
- 2-step protocol that can be completed in as little as 5 hr
- Compatible with mass spectrometry and Edman-based sequencing applications
- Broad linear range of 0.5 ng–1 µg
- Applicable as IEF gel stain

SYPRO Ruby Protein Gel Stain

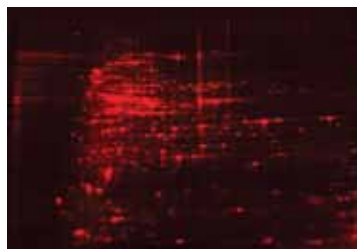
SYPRO Ruby protein gel stain is compatible with mass spectrometry and Edman-based sequencing applications.

- Lowest sensitivity range of 1–10 ng
- Detection of glycoproteins, lipoproteins, and metalloproteins
- No detection of extraneous nucleic acids in the sample
- Suitable for IEF gels

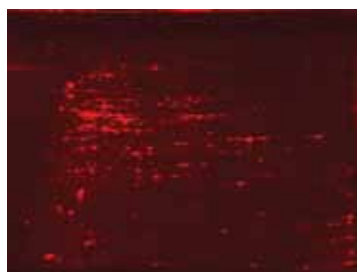
For More Information

Web: www.bio-rad.com/fluorescentstain

Request or download bulletin: 5346



Flamingo fluorescent gel stain. *E. coli* protein sample (10 µg).



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

Nucleic Acid Stain

Ethidium Bromide Solution

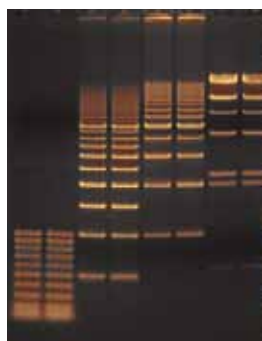
Order Info: Pg 182

Ethidium bromide is a sensitive fluorescent stain for visualizing DNA 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. The 10 mg/ml solution comes with a convenient dropper built into the lid of the bottle to prevent pipet contamination.

For More Information

Web: www.bio-rad.com/nastains



DNA stained with ethidium bromide.



Detection in Gels

Protein Stains

Catalog # Description

Coomassie Stains

Pg 179

Bio-Safe Coomassie Stain

161-0786 Bio-Safe Coomassie Stain, 1 L
161-0787 Bio-Safe Coomassie Stain, 5 L

Coomassie Brilliant Blue R-250 Staining and Destaining Solutions

161-0435 Coomassie Brilliant Blue R-250 Staining Solutions Kit, includes 1 L Coomassie Brilliant Blue R-250 staining solution, 2 x 1 L Coomassie Brilliant Blue R-250 destaining solution
161-0436 Coomassie Brilliant Blue R-250 Staining Solution, 1 L
161-0437 Coomassie Brilliant Blue R-250 Staining Solution, 4 x 1 L
161-0438 Coomassie Brilliant Blue R-250 Destaining Solution, 1 L
161-0439 Coomassie Brilliant Blue R-250 Destaining Solution, 4 x 1 L

Coomassie Stain Powders

161-0400 Coomassie Brilliant Blue R-250, 10 g
161-0406 Coomassie Brilliant Blue G-250, 10 g

Silver Stains

Pg 180

Silver Stain Plus Kit

161-0449 Silver Stain Plus Kit, includes fixative enhancer concentrate, silver complex solution, reduction moderator solution, image development reagent, development accelerator reagent, stains 13 full size or 40 mini gels
161-0448 Development Accelerator Reagent, 50 g
161-0461 Fixative Enhancer Concentrate,* 1 L
161-0462 Silver Complex Solution,* 100 ml
161-0463 Reduction Moderator Solution,* 100 ml
161-0464 Image Development Reagent,* 100 ml

* Hazardous shipping charges may apply.

Fluorescent Stains

Pg 180

Oriole Fluorescent Gel Stain

161-0495 Oriole Fluorescent Gel Stain, 1x solution, 200 ml
161-0496 Oriole Fluorescent Gel Stain, 1x solution, 1 L

Flamingo Fluorescent Gel Stain

161-0490 Flamingo Fluorescent Gel Stain, 10x solution, 20 ml
161-0491 Flamingo Fluorescent Gel Stain, 10x solution, 100 ml
161-0492 Flamingo Fluorescent Gel Stain, 10x solution, 500 ml

SYPRO Ruby Protein Gel Stain

170-3126 SYPRO Ruby Protein Gel Stain, 1x solution, 200 ml
170-3125 SYPRO Ruby Protein Gel Stain, 1x solution, 1 L
170-3138 SYPRO Ruby Protein Gel Stain, 1x solution, 5 L

Nucleic Acid Stain

Ethidium Bromide Solution

Pg 181

161-0433 Ethidium Bromide Solution, 10 mg/ml, 10 ml

Blotting Systems

Overview of Blot Transfer Systems

- **Semi-dry transfer systems** — for rapid, high-intensity transfers best suited for mid-range proteins, 10–100 kD or >200 kD for the Trans-Blot® Turbo™ system (page 184)
- **Tank transfer systems** — ideal for most routine protein work, tank transfer systems provide efficient and quantitative protein transfers over a broad MW range and are available with either plate or wire electrodes (pages 186–187)
- **Microfiltration (dot blotting) and screening systems** — used to determine working conditions for a new blotting assay or in situations where protein separation is not required; suitable for both protein and nucleic acid blotting (pages 188–189)
- **Vacuum transfer system** — quick and efficient transfer of DNA or RNA from an agarose gel onto a nylon membrane (page 189)

Blotting Selection Guide

| | Mini Trans-Blot® | Criterion™ Blotter | Trans-Blot® | Trans-Blot® Plus | Trans-Blot® SD | Trans-Blot Turbo |
|---------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Blotting area | 10 x 7.5 cm | 15 x 9.4 cm | 16 x 20 cm | 28 x 26.5 cm | 24 x 16 cm | 15 x 11 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 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 cm | 4.3 cm | 2 positions: 4 and 8 cm | 3 positions: 4, 7, and 10 cm | Determined by thickness of the gel and membrane sandwich and filter paper stack | ~8 mm depending on gel thickness |
| Electrode dimensions | — | — | — | — | 25 x 18 cm | 16 x 12 cm |
| Electrode materials | Platinum wire | Platinum-coated titanium anode with stainless-steel cathode plates or platinum wire | Platinum-coated titanium anode with stainless-steel cathode plates or platinum wire | Platinum-coated titanium anode and stainless-steel cathode plates | Platinum-coated titanium anode and stainless-steel cathode plates | Platinum-coated titanium anode and stainless-steel cathode plates |
| Transfer time | | | | | | |
| Wire electrodes | Standard: 16 hr High-intensity: 1 hr | Standard: 60 min to overnight | Standard: 5 hr Overnight: 16 hr High-intensity: 30 min–4 hr | — | ~30 min | 3–10 min |
| Plate electrodes | | Standard: 30 min to overnight | Standard: 1–5 hr Overnight: 16 hr High-intensity: 30 min–1 hr | Standard: 16 hr High-intensity: 15 min–1 hr | — | — |
| Cooling | Blue cooling unit | Sealed ice block or optional Criterion blotter cooling unit | Super cooling coil | Super cooling coil | — | — |
| Overall dimensions (W x L x H) | 12 x 16 x 18 cm | 21.8 x 11.8 x 15 cm | 18 x 9.5 x 24 cm | 30 x 17.3 x 39.4 cm | 37 x 24 x 11 cm | 26 x 21 x 20 cm |

Semi-Dry Transfer Systems

Trans-Blot® Turbo™ Transfer System

Order Info: Pg 192

The Trans-Blot Turbo transfer system represents the next generation of protein transfer by integrating speed, improved performance, and ease-of-use into a complete system, providing results faster than any other method currently available.

The Trans-Blot Turbo blotting system combines traditional blotting techniques with modern filter paper and buffers, allowing rapid transfer of proteins with minimal preparation time. By providing the entire system in a ready-to-use format, researchers can obtain their results faster and easier with reproducibility that is difficult to achieve by traditional tank and semi-dry blotting methods.

Rapid, High-Throughput Transfer

- Transfers standard mini or midi gels in as little as 3 min
- Efficient transfer of high- and low-MW proteins
- Can transfer 1–4 mini or 1–2 midi gels in a single run
- No cooling period required between runs
- Specialized protocol for Mini-PROTEAN® TGX™ gel transfer in 3 min
- No need to pre-equilibrate gels prior to transfer

No Buffer or Membrane Preparation

- Ready-to-use transfer packs eliminate the need for buffer and membrane preparation
- Transfer packs available with nitrocellulose or PVDF
- Proprietary buffer included in each transfer pack

Flexible Design

- Option to use either rapid preset protocols or customize transfer conditions
- Accommodates traditional semi-dry consumables
- Compatible with various gel types and percentages
- Ability to customize and store protocols within the instrument

Environmentally Friendly

- Environmentally safe consumables eliminate disposal cost
- Single-use consumables reduce extraneous waste



Robust Design

- Durable polycarbonate exterior
- Platinum anode and stainless steel cathode are reusable and easy to clean
- Life-cycle tested springs ensure reproducible performance
- Compact design with handle for easy transport
- Integrated power supply means no external power supply is needed

For More Information

Web: www.bio-rad.com/turbo

Request or download bulletin: 6039

Trans-Blot® SD Semi-Dry Transfer Cell

Order Info: Pg 192

See Also

PowerPac HC power supply: page 151.
Blotting buffers: page 144.

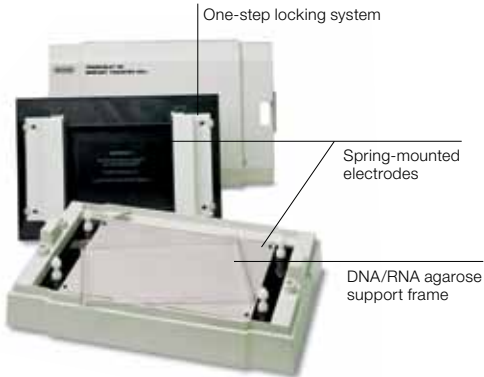
The Trans-Blot SD semi-dry transfer cell allows fast and efficient blotting without buffer tank or gel cassettes. Features include:

- 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.

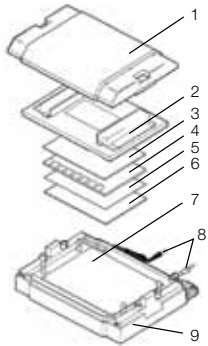
For More Information

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 4 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.

Tank Transfer Systems

See Also

PowerPac Basic and HC power supplies: page 151.
Ready Gel precast gels: page 158.
Blotting membranes: pages 190–191.
Blot detection reagents: pages 197–201.
Buffers: page 144.

Mini Trans-Blot® Cell

Order Info: Pg 192

This cell provides rapid, high-quality blotting of mini gels. A component of the Mini-PROTEAN® Tetra system, the Mini Trans-Blot cell accommodates two gel holder cassettes for electrophoretic transfer of mini format gels.

- Ability to transfer two 10 x 7.5 cm gels in just 1 hr; low-intensity, overnight transfers are also possible
- Placement of wire electrodes 4 cm apart for strong electrical fields and efficient protein transfer
- Color-coded cassettes and electrodes to ensure proper orientation of the gel during transfer
- Blue cooling unit, contained within the Mini Trans-Blot cell, absorbs heat generated during rapid transfers
- Availability either as a complete stand-alone apparatus or as a module compatible with the Mini-PROTEAN Tetra cell

Mini Trans-Blot cell components:

1. Buffer tank and lid.
2. Blue cooling unit.
3. Foam pads.
4. Gel holder cassette.
5. Electrophoresis blotting module.



For More Information

Request or download bulletin: 2033

Specifications

| | |
|--------------------------|------------------------------------------------------------------------------------------|
| Maximum gel size (W x L) | 10 x 7.5 cm |
| Buffer requirement | 1.2 L |
| Gel capacity | 2 Mini-PROTEAN handcast gels, 2 Mini-PROTEAN® precast gels, or 2 Ready Gel® precast gels |
| Recommended power supply | PowerPac™ HC (PowerPac Basic is a suitable alternative) |
| Dimensions (W x L x H) | 12 x 16 x 18 cm |

See Also

PowerPac Basic and PowerPac HC power supplies: page 151.
Criterion precast gels: pages 161–162.
Blotting membranes: pages 190–191.
Blot detection reagents: pages 197–201.
Buffers: page 144.

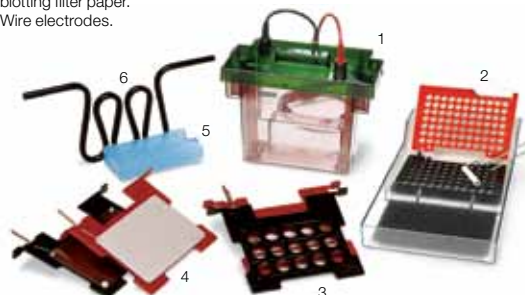
Criterion™ Blotter

Order Info: Pg 193

- 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 — your choice
- 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

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.



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.

Trans-Blot® Cell

Order Info: Pg 193

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 — your choice
- 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

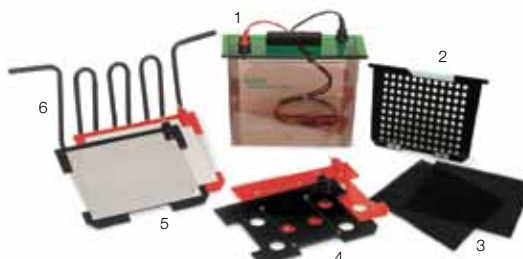
Specifications

| | |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 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.

Trans-Blot cell components:

1. Buffer tank and lid with cables.
2. Gel holder cassette.
3. Foam pads.
5. Plate electrodes.
6. Super cooling coil.



See Also

PowerPac HC power supply: page 151.

Precast gels: pages 157–158, 161–162.

Blotting membranes: pages 190–191.

Blot detection reagents: pages 197–201.

Buffers: page 144.

Trans-Blot® Plus Cell

Order Info: Pg 193

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

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 |

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 151.

Precast gels: pages 157–158, 161–162.

Blotting membranes: pages 190–191.

Blot detection reagents: pages 197–201.

Gel clip: page 167.

Buffers: page 144.

Microfiltration and Screening Systems

Bio-Dot® and Bio-Dot SF Microfiltration Apparatus

Order Info: Pg 194

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. Both are 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 (3-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) |

Mini-PROTEAN® II Multiscreen Apparatus

Order Info: Pg 194

Advantages of the Mini-PROTEAN® II multiscreen apparatus include:

- Allows 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 |

Mini Incubation Trays

Order Info: Pg 194

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 8-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



Vacuum Transfer System

A vacuum transfer system is available for the rapid transfer of DNA or RNA from agarose gels onto membranes.

Model 785 Vacuum Blotter

Order Info: Pg 194

This vacuum blotter transfers DNA or RNA from an agarose gel onto a nylon membrane. Small fragments ($\leq 1,500$ bp) are transferred in 30 minutes, and genomic DNA-size fragments in 90 minutes. Features include:

- Easy assembly — gel-to-membrane alignment is simple using the green window gaskets, and the sealing frame requires no screws or clamps to tighten
- Window gaskets that can be cut to accommodate gels as large as 20 x 25 cm
- Uniform transfers regardless of the gel size
- Unique regulator for simple pressure control avoiding high pressures that can lead to gel collapse
- Durable molded plastic construction that is resistant to the chemicals commonly used in transfers such as 0.25 N HCl and 0.5 N NaOH; the window gaskets are also resistant to these chemicals



For More Information

Web: www.bio-rad.com/nablotters

Request or download bulletin: 1584

Blotting Membranes

Bio-Rad offers a comprehensive line of blotting membranes including different grades of nitrocellulose, PVDF, and Zeta-Probe® nylon membranes. Use the selection guide below to choose the membrane appropriate for your application.

For More Information

Web: www.bio-rad.com/blottingmembranes

Request or download bulletins: 1939 and 2212

Blotting Membrane and Filter Paper Selection Guide

| Membrane | Pore Size | Binding Capacity (µg/cm²) | Compatible Detection Methods | Notes |
|-------------------------------|-------------------|---------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Nitrocellulose | 0.45 µm 0.2 µm | 80–100 | Colorimetric, chemiluminescence, chemifluorescence, radioactive | General-purpose protein blotting membrane |
| Supported nitrocellulose | 0.45 µm 0.2 µm | 80–100 | Colorimetric, chemiluminescence, chemifluorescence, radioactive | Pure nitrocellulose cast on an inert synthetic support; increased strength for easier handling and for reprobing |
| Immun-Blot® PVDF | 0.2 µm | 150–160 | Colorimetric, chemiluminescence, radioactive | High mechanical strength and chemical stability; recommended for western blotting |
| NEW Immun-Blot LF PVDF | 0.45 µm | 155–300 | Colorimetric, chemiluminescence, chemifluorescence, fluorescence | High mechanical strength and chemical stability; low autofluorescence; recommended for western blotting using fluorescence detection |
| Sequi-Blot™ PVDF | 0.2 µm | 170–200 | Colorimetric, radioactive | High mechanical strength and chemical stability; recommended for protein sequencing |

| Blotting Apparatus | Precut Membrane Sizes | Precut Filter Paper Sizes | Membrane/Filter Paper Sandwiches |
|----------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------|
| Mini Trans-Blot® cell | 7 x 8.5 cm | 7.5 x 10.5 cm | 7 x 8.5 cm |
| Criterion™ blotter | 8.5 x 13.5 cm | 9.5 x 15.2 cm | 8.5 x 13.5 cm |
| Trans-Blot® cell | 13.5 x 16.5 cm | 15 x 20 cm | — |
| Trans-Blot Plus cell | 25 x 28 cm 26.5 x 28 cm | — — | — — |
| Trans-Blot SD cell | 7 x 8.5 cm 11.5 x 16 cm 15 x 15 cm 15 x 9.2 cm 20 x 20 cm | 7 x 8.5 cm 8 x 13.5 cm 14 x 16 cm 18 x 18.5 cm — | 7 x 8.5 cm 8.5 x 13.5 cm — — — |
| Mini-PROTEAN® II multiscreen apparatus | 7 x 8.5 cm 7 x 8.5 cm 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 191.

Nitrocellulose Membranes

Order Info: Pg 195

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).



PVDF Membranes

Order Info: Pg 195

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.

NEW Immun-Blot Low-Fluorescence PVDF Membrane

Optimized for fluorescence applications, the low-fluorescence property of the membrane enhances image quality and improves sensitivity of all fluorescence detection protocols; it is ideal for multiplex, fluorescence western blotting, and chemifluorescence applications. The membrane is also compatible with other detection methods such as chemiluminescence and colorimetric detection.

For More Information

Request or download bulletin: 2212 and 6116

Zeta-Probe® Nylon Membranes

Order Info: Pg 196

Zeta-Probe Membranes

Zeta-Probe membranes bind nucleic acids independently of buffer pH, so they can be used in traditional Southern blots, rapid alkaline Southern and northern blotting techniques, and electrophoretic transfer of nucleic acids from agarose and polyacrylamide gels. Zeta-Probe membranes can be repeatedly hybridized and stripped as many as 20 times for DNA (Li et al. 1987) and 6 times for RNA (Gatti et al. 1984). Oligonucleotides as short as 6 bases will bind to the membrane, and oligonucleotides ≥20 bases long will be retained after repeated hybridization and washing.

Zeta-Probe GT Membranes

Zeta-Probe GT (genomic DNA-tested) membranes meet all performance specifications of Zeta-Probe membranes, and each lot is also functionally tested to ensure that 3 pg of single-copy factor VIII human DNA can be detected in 5 µg total genomic DNA.

For More Information

Request or download bulletins: 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.

Filter Paper

Order Info: Pg 196

Bio-Rad offers a range of filter papers for blotting applications, including filter paper precut to fit standard gel sizes.

Blotting Stains and Tracking Dyes

Order Info: Pg 203

Bio-Rad offers a selection of stains for blotting applications; see page 201. Tracking dyes can be found on page 145.

Blotting Systems

Semi-Dry Transfer Systems

Catalog #

Description

Trans-Blot Turbo Blotting System

Pg 184

| | |
|----------|---------------------------------------------------------------------------------------|
| 170-4150 | Trans-Blot Turbo Blotting System , includes 2 cassettes, roller |
| 170-4151 | Trans-Blot Turbo Cassette , 1 cassette |
| 170-4152 | Trans-Blot Turbo Base , base instrument, no cassettes included |
| 170-4156 | Trans-Blot Turbo Transfer Pack , 0.2 µm PVDF, 7 x 8.5 cm, 10 pack |
| 170-4157 | Trans-Blot Turbo Transfer Pack , 0.2 µm PVDF, 8.5 x 13.5 cm, 10 pack |
| 170-4158 | Trans-Blot Turbo Transfer Pack , 0.2 µm nitrocellulose, 7 x 8.5 cm, 10 pack |
| 170-4159 | Trans-Blot Turbo Transfer Pack , 0.2 µm nitrocellulose, 8.5 x 13.5 cm, 10 pack |

Trans-Blot SD Semi-Dry Transfer Cell

Pg 185

| | |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-3940* | Trans-Blot SD Semi-Dry Electrophoretic Transfer Cell , includes transfer cell, agarose gel support frame, extra thick blot paper (7 x 8.4 cm, 60 sheets; 8 x 13.5 cm, 60 sheets; 14 x 16 cm, 30 sheets; 18 x 18.5 cm, 30 sheets) |
| 170-3848 | Trans-Blot SD Cell and PowerPac HC Power Supply , 100–120/220–240 V, includes 170-3940 and 164-5052 |
| 170-3849 | Trans-Blot SD Cell and PowerPac Universal Power Supply , 100–120/220–240 V, includes 170-3940 and 164-5070 |

Accessories

| | |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-3947 | Cathode Plate , stainless-steel upper electrode |
| 170-3942 | Anode Plate , platinum-coated lower electrode |
| 170-4019 | Trans-Blot SD Agarose Gel Support Frame , includes extra thick blot paper (15 x 20 cm, 30 sheets) |
| 170-3957 | Trans-Blot SD DNA/RNA Blotting Kit , includes SD agarose gel support frame, extra thick blot paper (15 x 20 cm, 30 sheets), 1 L 10x TBE buffer |

* The Trans-Blot SD semi-dry transfer cell requires the use of a microprocessor-controlled power supply.

Tank Transfer Systems

Mini Trans-Blot Cell

Pg 186

| | |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-3930 | Mini Trans-Blot Electrophoretic Transfer Cell , includes 2 gel holder cassettes, 4 foam pads, modular electrode assembly, blue cooling unit, lower buffer tank, lid with cables |
| 170-3935* | Mini Trans-Blot Module , without lower buffer tank and lid |
| 170-3989 | Mini Trans-Blot Cell and PowerPac Basic Power Supply , includes 170-3930 and 164-5050 |
| 170-3836 | Mini Trans-Blot Cell and PowerPac HC Power Supply , includes 170-3930 and 164-5052 |
| 165-8029 | Mini-PROTEAN Tetra Cell and Mini Trans-Blot Module , includes 10-well, 1.0 mm, 4-gel system (165-8001) and blotting module (170-3935) without lower buffer tank and lid, gel casting accessories |
| 165-8033 | Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes 165-8001, 170-3935, and 164-5050 |
| 165-8034 | Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes 165-8004, 170-3935, and 164-5050 |
| 165-8036 | Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes 165-8004, 170-3935, and 164-5052 |
| 165-8035 | Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes 165-8001, 170-3935, and 164-5052 |

Accessories

| | |
|----------|--------------------------------------------------------------------------------|
| 170-3931 | Mini Gel Holder Cassette |
| 170-3932 | Thick Blot Paper , 7.5 x 10 cm, for Mini Trans-Blot cassette, 50 sheets |
| 170-3933 | Foam Pads , 8 x 11 cm, 4 |
| 170-3812 | Mini Trans-Blot Central Core |
| 170-3919 | Blue Cooling Unit , for Mini-PROTEAN Tetra tanks |
| 170-3934 | Bio-Ice Cooling Unit , for Mini-PROTEAN 3 tanks |
| 165-1279 | Roller , 3.5 in wide |

* Also fits in the Mini-PROTEAN® 3 electrophoresis cell.

Catalog # Description

Criterion Blotter

Pg 186

- 170-4070 **Criterion Blotter with Plate Electrodes**, includes cell assembled with plate electrodes, lid with cables, 2 Criterion gel holder cassettes, 1 pack precut blot absorbent filter paper, 4 foam pads, gel/blot assembly tray, roller, sealed ice block
- 170-4071 **Criterion Blotter with Wire Electrodes**, includes cell assembled with wire electrodes, lid with cables, 2 Criterion gel holder cassettes, 1 pack precut blot absorbent filter paper, 4 foam pads, gel/blot assembly tray, roller, sealed ice block
- 165-6024 **Criterion Cell/Plate Blotter System**, includes 165-6001 and 170-4070
- 165-6025 **Criterion Cell/Wire Blotter System**, includes 165-6001 and 170-4071
- 170-3872 **Criterion Blotter with Plate Electrodes and PowerPac HC Power Supply**, includes 170-4070 and 164-5052
- 170-3874 **Criterion Blotter with Wire Electrodes and PowerPac HC Power Supply**, includes 170-4071 and 164-5052

Accessories and Replacement Parts

- 170-4076 **Optional Criterion Blotter Cooling Coil**, optional
- 170-4077 **Criterion Blotter Buffer Tank**
- 170-4079 **Criterion Blotter Lid**
- 170-4080 **Criterion Blotter Gel Holder Cassette**
- 170-4081 **Criterion Blotter Platinum Anode Plate Electrode**
- 170-4082 **Criterion Blotter Stainless-Steel Cathode Plate Electrode**
- 170-4083 **Criterion Blotter Wire Electrode Card**, anode
- 170-4084 **Criterion Blotter Wire Electrode Card**, cathode
- 170-4085 **Thick Blot Paper**, 9.5 x 15.2 cm, for Criterion blotter, 50 sheets
- 170-4086 **Foam Pads**, 9.5 x 15.2 cm, 4
- 170-4087 **Sealed Ice Blocks**, for Criterion blotter, 2
- 170-4089 **Criterion Gel/Blot Assembly Tray**
- 165-1279 **Roller**, 3.5" wide

Trans-Blot Cell

Pg 187

- 170-3939* **Trans-Blot Cell with Plate Electrodes and Super Cooling Coil**, includes 2 gel holder cassettes, buffer tank, lid with power cables, 4 foam pads, 1 pack precut blot absorbent filter paper (15 x 20 cm)
- 170-3853* **Trans-Blot Cell with Plate Electrodes, Super Cooling Coil, and PowerPac HC Power Supply**, 0 includes 170-3939, 170-3912, and 164-5052
- 170-3946 **Trans-Blot Cell with Plate Electrodes**, includes 2 gel holder cassettes, buffer tank, lid with power cables, 4 foam pads, 1 pack precut blot absorbent filter paper (15 x 20 cm)
- 170-3850 **Trans-Blot Cell with Plate Electrodes and PowerPac HC Power Supply**, includes 170-3946 and 164-5052
- 170-3910 **Trans-Blot Cell with Wire Electrodes**, includes 2 gel holder cassettes, buffer tank, lid with power cables, 4 foam pads, 1 pack precut blot absorbent filter paper (15 x 20 cm)
- 170-3825 **Trans-Blot Cell with Wire Electrodes and PowerPac HC Power Supply**, includes 170-3910 and 164-5052

Accessories

- 170-3914 **Foam Pads**, 15.5 x 20.5 cm, 6
- 170-3956 **Thick Blot Paper**, 15 x 20 cm, for Trans-Blot cassette, 25 sheets
- 170-3960 **Extra Thick Blot Paper**, 15 x 20 cm, 30 sheets
- 170-3943 **Trans-Blot Platinum Anode Plate Electrode**
- 170-3944 **Trans-Blot Stainless-Steel Cathode Plate Electrode**
- 170-3945 **Trans-Blot Plate Electrode Pair**, platinum anode and stainless-steel cathode
- 170-3920 **Trans-Blot Standard Wire Electrode Card**, cathode
- 170-3921 **Trans-Blot Standard Wire Electrode Card**, anode
- 170-3912 **Super Cooling Coil**, required for all high-intensity transfers
- 170-3913 **Gel Holder Cassette**, includes 2 foam pads
- 170-3922 **Trans-Blot Cell Buffer Tank**
- 170-3923 **Trans-Blot Cell Lid with Power Cables**

* Trans-Blot cells require the super cooling coil for high-intensity transfers; the super cooling coil is also recommended for all applications using plate electrodes.

Trans-Blot Plus Cell

Pg 187

- 170-3990* **Trans-Blot Plus Cell with Plate Electrodes and Super Cooling Coil**, includes 3 gel holder cassettes, buffer tank, lid with power cables, 6 foam pads, 1 pack blot absorbent filter paper (26.5 x 28 cm, 30 sheets), roller, stirbar
- 170-3991 **Trans-Blot Plus Cell and PowerPac HC Power Supply**, 100–120/220–240 V, includes 170-3990 and 164-5052
- 170-3992 **Trans-Blot Plus Cell and PowerPac Universal Power Supply**, 100–120/220–240 V, includes 170-3990 and 164-5070
- 165-4144 **PROTEAN Plus Dodeca Cell (100/120 V)**, **Trans-Blot Plus Cell**, and **PowerPac Universal Power Supply**, includes 165-4150, 170-3990, and 164-5070
- 165-4145 **PROTEAN Plus Dodeca Cell (220/240 V)**, **Trans-Blot Plus Cell**, and **PowerPac Universal Power Supply**, includes 165-4151, 170-3990, and 164-5070

Ordering Information

Blotting Systems

www.bio-rad.com

| Catalog # | Description |
|-----------|-------------|
|-----------|-------------|

Accessories

| | |
|----------|----------------------------------------------------------------|
| 170-3995 | Foam Pads, 27 x 28.5 cm, 2 |
| 170-3997 | Stirbar |
| 170-3998 | Trans-Blot Plus Roller, 6 in wide |
| 170-3999 | Trans-Blot Plus Gel Holder Cassette with Clamps |
| 170-4990 | Trans-Blot Plus Super Cooling Coil |
| 170-4991 | Trans-Blot Plus Platinum Anode Plate Electrode |
| 170-4992 | Trans-Blot Plus Stainless-Steel Cathode Plate Electrode |
| 170-4995 | Trans-Blot Plus Cell Buffer Tank |
| 170-4996 | Trans-Blot Plus Cell Lid with Cables |
| 170-4997 | Gel Holder Cassette Clamps, for Trans-Blot Plus cell, set of 3 |

* Trans-Blot cells require the super cooling coil for high-intensity transfers; the super cooling coil is also recommended for all applications using plate electrodes.

Microfiltration and Screening Systems

Bio-Dot Systems and Bio-Dot SF Microfiltration Apparatus

Pg 188

| | |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-3938 | Bio-Dot Microfiltration System , includes Bio-Dot apparatus (170-6545) and Bio-Dot SF module (170-6543) templates, vacuum manifold base, gasket support plates, gasket |
| 170-6545 | Bio-Dot Apparatus , includes Bio-Dot sample template, vacuum manifold base, gasket support plate, gasket |
| 170-6547 | Bio-Dot Module , without vacuum manifold base, for conversion of Bio-Dot SF to Bio-Dot apparatus |
| 170-6542 | Bio-Dot SF Apparatus , includes Bio-Dot SF sample template, vacuum manifold base, gasket support plate, gasket, filter paper |
| 170-6543 | Bio-Dot SF Module , without vacuum manifold base, for conversion of Bio-Dot to Bio-Dot SF apparatus |

Accessories

| | |
|----------|-----------------------------------------------------------|
| 170-6546 | Bio-Dot Gaskets, 3 |
| 170-6544 | Bio-Dot SF Gaskets, 2 |
| 162-0161 | Bio-Dot/Bio-Dot SF Filter Paper, 11.3 x 7.7 cm, 60 sheets |

Mini-PROTEAN II Multiscreen Apparatus

Pg 188

| | |
|----------|---------------------------------------------------------------------------------------------------|
| 170-4017 | Mini-PROTEAN II Multiscreen Apparatus , includes 2 sample templates, 2 gaskets, base plate |
| 170-4018 | Multiscreen Gaskets , 2 |

Mini Incubation Trays

Pg 189

| | |
|----------|------------------------------------|
| 170-3902 | Mini Incubation Trays , 20 |
| 170-3903 | Mini Incubation Trays , 100 |

Vacuum Transfer System

Model 785 Vacuum Blotter

Pg 189

| | |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 165-5000 | Model 785 Vacuum Blotter with Regulator , includes vacuum regulator, base with vacuum stage, porous vacuum plate, reservoir seal O-ring, sealing frame, assorted window gaskets, lid |
| 165-5001 | Model 785 Vacuum Blotter System , 100/120 V, includes vacuum pump, vacuum regulator, base with vacuum stage, porous vacuum plate, reservoir seal O-ring, sealing frame, assorted window gaskets, lid |
| 165-5002 | Model 785 Vacuum Blotter System , 220/240 V |
| 165-5003 | Model 785 Vacuum Blotter Basic Unit , includes base with vacuum stage, porous vacuum plate, reservoir seal O-ring, sealing frame, assorted window gaskets, lid |

Accessories

| | |
|----------|---------------------------------------------------------------------------|
| 165-5004 | Vacuum Station , 100/120 V, includes vacuum pump, vacuum regulator |
| 165-5005 | Vacuum Station , 220/240 V |
| 165-5006 | Vacuum Regulator |
| 165-5007 | Reservoir Seal O-Ring |
| 165-5008 | Blank Window Gaskets , 6 |
| 165-5012 | Porous Vacuum Plate |

Blotting Membranes

| Nitrocellulose Membranes | | Pg 190 |
|-----------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog # | Description | Recommended Uses |
| Nitrocellulose Membranes (0.2 µm) | | |
| 162-0112 | Nitrocellulose Membrane, 0.2 µm, 30 cm x 3.5 m, 1 roll | Transfer of low MW proteins or nucleic acids (has smaller pore size) |
| 162-0212 | Nitrocellulose/Filter Paper Sandwiches, 0.2 µm, 7 x 8.4 cm, 20 pack | |
| 162-0213 | Nitrocellulose/Filter Paper Sandwiches, 0.2 µm, 7 x 8.4 cm, 50 pack | |
| 162-0232 | Nitrocellulose/Filter Paper Sandwiches, 0.2 µm, 8.5 x 13.5 cm, 20 pack | |
| 162-0233 | Nitrocellulose/Filter Paper Sandwiches, 0.2 µm, 8.5 x 13.5 cm, 50 pack | |
| 162-0146 | Nitrocellulose Membranes, 0.2 µm, 7 x 8.4 cm, 10 sheets | |
| 162-0168 | Nitrocellulose Membranes, 0.2 µm, 8.5 x 13.5 cm, 10 sheets | |
| 162-0147 | Nitrocellulose Membranes, 0.2 µm, 13.5 x 16.5 cm, 10 sheets | |
| 162-0150 | Nitrocellulose Membranes, 0.2 µm, 20 x 20 cm, 5 sheets | |
| 162-0252 | Nitrocellulose Membranes, 0.2 µm, 26.5 x 28 cm, 10 sheets | |
| Nitrocellulose Membranes (0.45 µm) | | |
| 162-0115 | Nitrocellulose Membrane, 0.45 µm, 30 cm x 3.5 m, 1 roll | Transfer of proteins (antigens, immunoglobulins, glycoprotein receptor proteins, histones and nonhistones, etc.); capillary Southern blotting of ssDNA and RNA <500 bp (use Zeta-Probe membranes for blotting ssDNA and RNA of all sizes) |
| 162-0214 | Nitrocellulose/Filter Paper Sandwiches, 0.45 µm, 7 x 8.4 cm, 20 pack | |
| 162-0215 | Nitrocellulose/Filter Paper Sandwiches, 0.45 µm, 7 x 8.4 cm, 50 pack | |
| 162-0234 | Nitrocellulose/Filter Paper Sandwiches, 0.45 µm, 8.5 x 13.5 cm, 20 pack | |
| 162-0235 | Nitrocellulose/Filter Paper Sandwiches, 0.45 µm, 8.5 x 13.5 cm, 50 pack | |
| 162-0145 | Nitrocellulose Membranes, 0.45 µm, 7 x 8.4 cm, 10 sheets | |
| 162-0167 | Nitrocellulose Membranes, 0.45 µm, 8.5 x 13.5 cm, 10 sheets | |
| 162-0117 | Nitrocellulose Membranes, 0.45 µm, 9 x 12 cm, 10 sheets | |
| 162-0148 | Nitrocellulose Membranes, 0.45 µm, 11.5 x 16 cm, 10 sheets | |
| 162-0114 | Nitrocellulose Membranes, 0.45 µm, 15 x 9.2 cm, 10 sheets | |
| 162-0116 | Nitrocellulose Membranes, 0.45 µm, 15 x 15 cm, 10 sheets | |
| 162-0113 | Nitrocellulose Membranes, 0.45 µm, 20 x 20 cm, 5 sheets | |
| 162-0251 | Nitrocellulose Membranes, 0.45 µm, 26.5 x 28 cm, 10 sheets | |
| Supported Nitrocellulose Membranes (0.2 µm) | | |
| 162-0097 | Supported Nitrocellulose Membrane, 0.2 µm, 30 cm x 3 m, 1 roll | Protein and nucleic acid blotting |
| 162-0095 | Supported Nitrocellulose Membranes, 0.2 µm, 7 x 8.4 cm, 10 sheets | |
| 162-0071 | Supported Nitrocellulose Membranes, 0.2 µm, 8.5 x 13.5 cm, 10 sheets | |
| Supported Nitrocellulose Membranes (0.45 µm) | | |
| 162-0094 | Supported Nitrocellulose Membrane, 0.45 µm, 30 cm x 3 m, 1 roll | Protein and nucleic acid blotting |
| 162-0090 | Supported Nitrocellulose Membranes, 0.45 µm, 7 x 8.4 cm, 10 sheets | |
| 162-0070 | Supported Nitrocellulose Membranes, 0.45 µm, 8.5 x 13.5 cm, 10 sheets | |
| 162-0093 | Supported Nitrocellulose Membranes, 0.45 µm, 20 x 20 cm, 10 sheets | |
| PVDF Membranes | | |
| Immun-Blot PVDF Membranes | | |
| 162-0177 | Immun-Blot PVDF Membrane, 26 cm x 3.3 m, 1 roll | |
| 162-0218 | Immun-Blot PVDF/Filter Paper Sandwiches, 7 x 8.4 cm, 20 pack | |
| 162-0219 | Immun-Blot PVDF/Filter Paper Sandwiches, 7 x 8.4 cm, 50 pack | |
| 162-0238 | Immun-Blot PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 20 pack | |
| 162-0239 | Immun-Blot PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 50 pack | |
| 162-0174 | Immun-Blot PVDF Membranes, 7 x 8.4 cm, 10 sheets | |
| 162-0175 | Immun-Blot PVDF Membranes, 10 x 15 cm, 10 sheets | |
| 162-0176 | Immun-Blot PVDF Membranes, 20 x 20 cm, 10 sheets | |
| 162-0255 | Immun-Blot PVDF Membranes, 25 x 28 cm, 10 sheets | |
| Sequi-Blot PVDF Membranes | | |
| 162-0184 | Sequi-Blot PVDF Membrane, 26 cm x 3.3 m, 1 roll | |
| 162-0237 | Sequi-Blot PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 50 pack | |
| 162-0186 | Sequi-Blot PVDF Membranes, 7 x 8.4 cm, 10 sheets | |
| 162-0180 | Sequi-Blot PVDF Membranes, 10 x 15 cm, 10 sheets | |
| 162-0181 | Sequi-Blot PVDF Membranes, 15 x 15 cm, 10 sheets | |
| 162-0182 | Sequi-Blot PVDF Membranes, 20 x 20 cm, 10 sheets | |
| Immun-Blot Low-Fluorescence PVDF Membranes | | |
| 162-0260 | Low Fluorescence PVDF/Filter Paper Sandwiches, 7 x 8.5 cm, 10 pack | |
| 162-0261 | Low Fluorescence PVDF/Filter Paper Sandwiches, 7 x 8.5 cm, 20 pack | |
| 162-0262 | Low Fluorescence PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 10 pack | |
| 162-0263 | Low Fluorescence PVDF/Filter Paper Sandwiches, 8.5 x 13.5 cm, 20 pack | |
| 162-0264 | Low Fluorescence PVDF Roll, 28 x 380 cm, 1 roll | |

Ordering Information

Blotting Membranes

www.bio-rad.com

Zeta-Probe Nylon Membranes

Pg 191

| Description | Zeta-Probe | Zeta-Probe GT |
|-----------------------------------------------|------------|---------------|
| Zeta-Probe and Zeta-Probe GT Membranes | | |
| 30 cm x 3.3 m, 1 roll | 162-0159 | 162-0196 |
| 20 cm x 3.3 m, 1 roll | 162-0165 | 162-0197 |
| 7 x 10 cm, 15 sheets | 162-0206 | 162-0208 |
| 9 x 12 cm, 15 sheets | 162-0153 | 162-0190 |
| 10 x 15 cm, 15 sheets | 162-0154 | 162-0191 |
| 15 x 15 cm, 15 sheets | 162-0155 | 162-0192 |
| 15 x 20 cm, 15 sheets | 162-0156 | 162-0193 |
| 20 x 20 cm, 15 sheets | 162-0157 | 162-0194 |
| 20 x 25 cm, 3 sheets | 162-0158 | 162-0195 |

Catalog # Description

C/P Lift Membranes

| | |
|----------|------------------------------------------------------|
| 162-0162 | C/P Lift Membrane Disks, 85 mm, 50 |
| 162-0163 | C/P Lift Membrane Disks, 137 mm, 15 |
| 170-3202 | Supported Nitrocellulose Membrane Disks, 82.5 mm, 50 |

Filter Paper

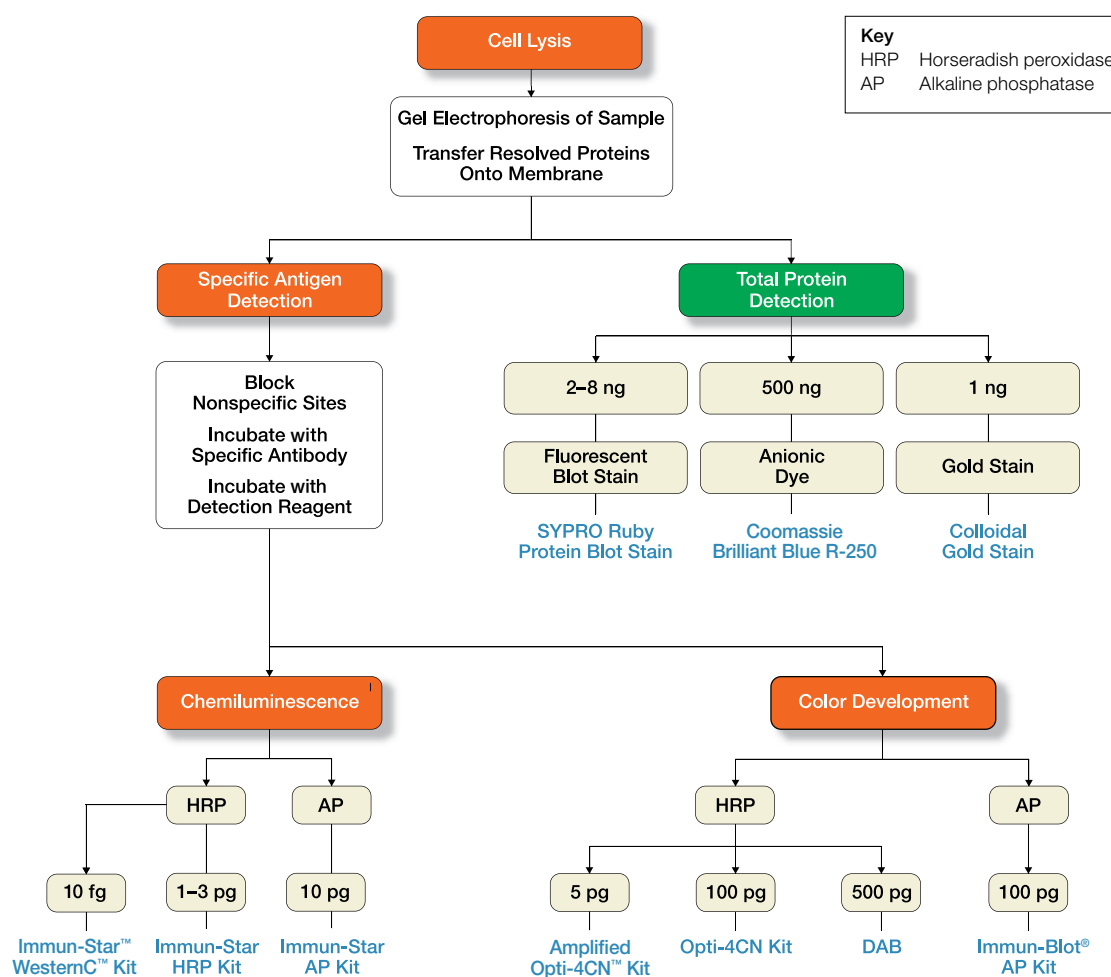
Pg 191

| Catalog # | Description | Recommended Uses |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Blot Absorbent Filter Paper (Extra Thick) | | |
| 170-3965 | Extra Thick Blot Paper , 7.5 x 10 cm, for Ready Gel or Mini-PROTEAN Tetra gels, 60 sheets | All blotting applications using the Trans-Blot SD cell or Trans-Blot cell (precut to gel dimensions from well to bottom of gel) |
| 170-3966 | Extra Thick Blot Paper , 7 x 8.4 cm, for Ready Gel or Mini-PROTEAN Tetra gels, 60 sheets | |
| 170-3967 | Extra Thick Blot Paper , 8 x 13.5 cm, for Criterion precast gels, 60 sheets | |
| 170-3968 | Extra Thick Blot Paper , 14 x 16 cm, for PROTEAN II xi gels, 30 sheets | |
| 170-3969 | Extra Thick Blot Paper , 19 x 18.5 cm, for PROTEAN II XL gels, 30 sheets | |
| 170-3958 | Extra Thick Blot Paper , 10 x 15 cm, 30 sheets | |
| 170-3959 | Extra Thick Blot Paper , 15 x 15 cm, 30 sheets | |
| 170-3960 | Extra Thick Blot Paper , 15 x 20 cm, 30 sheets | |
| Blot Absorbent Filter Paper (Thick) | | |
| 170-3932 | Thick Blot Paper , 7.5 x 10 cm, for Mini Trans-Blot cassette, 50 sheets | All blotting applications requiring thick, high-wet-strength filter paper |
| 170-4085 | Thick Blot Paper , 9.5 x 15.2 cm, for Criterion blotter, 50 sheets | |
| 170-3955 | Thick Blot Paper , 14 x 16 cm, for PROTEAN II xi gels, 25 sheets | |
| 170-3956 | Thick Blot Paper , 15 x 20 cm, for Trans-Blot cassette, 25 sheets | |
| 165-0921 | Thick Blot Paper , 18 x 34 cm, for Model 224, 443, and 543 slab gel dryers, 25 sheets | |
| 162-0161 | Bio-Dot/Bio-Dot SF Filter Paper , 7.7 x 11.3 cm, 60 sheets | |
| 165-0962 | Filter Paper Backing , 35 x 45 cm, for stained gels, 25 sheets | |
| Blot Absorbent Filter Paper (Thin) | | |
| 162-0118 | Thin Blot Paper , 33 cm x 3 m, 1 roll | All blotting applications requiring thin, high-wet-strength filter paper |

Detection on Blots

The most common blot detection techniques use antibodies to either probe for specific antigens in a complex protein sample or stain all proteins bound to a membrane. The chart indicates the maximum sensitivity achievable with each detection system.

For more information on methods, equipment, and reagents used in protein blotting, request the Protein Blotting Guide (bulletin 2895).



Blot detection reagent selection guide.

Chemiluminescence Detection

Chemiluminescent western blot detection offers highly sensitive detection of proteins bound to blotting membranes. Most specific antigen detection methods are based on HRP (horseradish peroxidase) or AP (alkaline phosphatase) secondary antibody conjugates. The signal can be captured with film or dedicated imaging equipment (see pages 232–237).

Chemiluminescence-Based Kit Selection Guide

| | Immun-Star™ WesternC™ | Immun-Star HRP | Immun-Star AP |
|-----------------------------|-------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------|
| Lower detection limit | Mid-femtogram | 1 pg | 10 pg |
| Signal duration | 24 hr | 6–8 hr | 24 hr |
| Primary detection method | Imaging equipment | Film | Film |
| Suggested antibody dilution | Primary: 1/1,000–1/50,000; Secondary: 1/50,000–1/250,000 | Primary: 1/1,000–1/5,000; Secondary: 1/20,000–1/100,000 | Primary: 1/1,000–1/6,000; Secondary: 1:3,000 |
| Working solution stability | 24 hr at room temperature | 24 hr at room temperature | 24 hr at room temperature |
| Recommended membrane | Nitrocellulose or PVDF | Nitrocellulose or PVDF | Nitrocellulose or PVDF |

Immun-Star™ WesternC™ Chemiluminescence Kit

[Order Info: Pg 202](#)

The Immun-Star WesternC chemiluminescence kit is compatible with any HRP-conjugated secondary antibody. It is designed for optimal use with Precision Plus Protein™ WesternC™ standards and ChemiDoc™ imaging systems. Features include:

- Long signal half-life — allowing multiple imaging of blots
- Femtogram-level sensitivity
- Stable light signal duration of 24 hr
- Shelf life of 12 months at room temperature



For More Information

Web: www.bio-rad.com/blotdetection
Request or download bulletin: 5572

Immun-Star™ HRP Chemiluminescence Kits

[Order Info: Pg 202](#)

The Immun-Star HRP kit is a highly sensitive, fast-acting detection system. Features include:

- Stable light signal duration of 6–8 hr
- Working solution stability of 24 hr at room temperature
- Short (~30 sec) exposure time
- Detection sensitivity of as little as 1–3 pg of protein

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

Immun-Star™ AP Chemiluminescence Kits

Order Info: Pg 202

These kits combine Bio-Rad's blotting reagents and CDP-Star chemiluminescence technology. Exposure times on film are typically between 30 seconds to 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

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 endpoint result does not allow the multiple exposures of chemiluminescent methods. Colorimetric detection is typically considered a medium-sensitivity method compared to radioactive or chemiluminescence detection. However, Bio-Rad offers amplified colorimetric systems that offer very high sensitivity that is comparable to or exceeds that of chemiluminescent detection.

For More Information

Web: www.bio-rad.com/blotdetection

Colorimetric HRP Detection

Order Info: Pg 202

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.

Colorimetric AP Detection

Order Info: Pg 203

Immun-Blot® AP Assay Kits

A common substrate for colorimetric detection on western blots based on AP-conjugated secondary antibodies is 5-bromo-4-chloro-3-indolyl phosphate/nitroblue tetrazolium (BCIP/NBT). Immun-Blot AP assay kits provide the essential reagents to perform colorimetric detection (of up to 100 pg of protein) based on AP and BCIP/NBT with the added convenience of premixed buffers and enzyme substrates. All kit components are individually tested for quality control in blotting applications.

Premixed and Individual AP Colorimetric Substrates

Premixed enzyme substrate kits provide convenience and reliability, and reduce exposure to hazardous reagents.

For More Information

Web: www.bio-rad.com/blotdetection

Request or download bulletins: 1600 and 2032



Western Blot Conjugates and Reagents

Blotting-Grade Conjugates and Reagents

Order Info: Pg 203

Protein A and Protein G Conjugates

Proteins A and G are bacterial cell surface proteins that bind to the Fc region of IgG molecules. Each reagent has different IgG binding capabilities, depending on the species of origin of the immunoglobulin.

Blotting-Grade Reagents

Detergents and blocking reagents for western blotting are available individually.

For More Information

Web: www.bio-rad.com/blotdetection

Binding Specificities of Protein A and Protein G Conjugates

| Immunoglobulin | Protein A | Protein G | Immunoglobulin | Protein A | Protein G |
|-------------------------|-----------|-----------|-------------------------|-----------|-----------|
| Human IgG ₁ | • | • | Mouse IgG _{2b} | • | • |
| Human IgG ₂ | • | • | Mouse IgG ₃ | • | • |
| Human IgG ₃ | — | • | Rat IgG ₁ | ° | ° |
| Human IgG ₄ | • | • | Rat IgG _{2a} | — | • |
| Mouse IgG ₁ | °/— | ° | Rat IgG _{2b} | — | ° |
| Mouse IgG _{2a} | • | • | Rat IgG _{2c} | • | • |

• Strong binding. ° Weak bind. — No binding.

Conjugates 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 1 year when stored at 4° C.

Total Protein Blot Detection

Bio-Rad offers three stain options for total protein detection. For electrophoresis stains, see pages 179–181.

Total Protein Stains

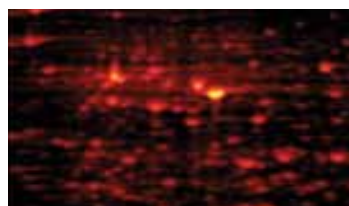
Order Info: Pg 203

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

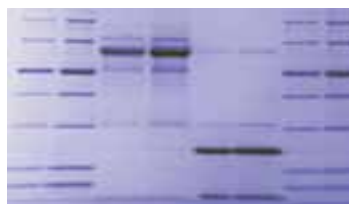
SYPRO Ruby protein blot stain provides highly sensitive detection of proteins on PVDF or nitrocellulose membranes. After staining, target proteins can be detected by colorimetric or chemiluminescence immunostaining or analyzed by microsequencing or mass spectrometry with no interference from the stain.



SYPRO Ruby protein gel stain.

Coomassie Brilliant Blue R-250 Dye

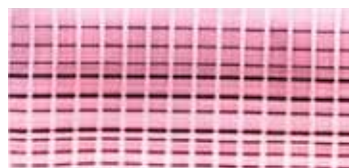
Coomassie Brilliant Blue R-250 is an anionic dye used for staining gels and membranes (PVDF and nitrocellulose). It is a rapid and inexpensive stain that can detect nanogram levels of protein. Since this dye can interfere with antibody binding sites, subsequent detection of proteins by immunostaining 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

Detection on Blots

Chemiluminescence Detection

Catalog # Description

Immun-Star WesternC Chemiluminescence Kit

Pg 198

170-5070 **Immun-Star WesternC Chemiluminescence Kit**, includes 50 ml of luminol/enhancer, 50 ml of stable peroxide buffer

Immun-Star HRP Chemiluminescence Kits

Pg 198

| Catalog # | Description | Substrate* | Antibody | TBS | Tween 20 | Blocker |
|---------------------------------------------|--------------------------------------------|------------|----------|-----|----------|---------|
| Immun-Star HRP Kits and Components** | | | | | | |
| 170-5044 | GAM-HRP Detection Kit ,*** 500 ml | • | • | • | • | • |
| 170-5045 | GAR-HRP Detection Kit ,*** 500 ml | • | • | • | • | • |
| 170-5040 | HRP Substrate , 500 ml | • | | | | |
| 170-5041 | HRP Substrate , 100 ml | • | | | | |
| 170-5043 | GAM-HRP Detection Reagents , 500 ml | • | • | | | |
| 170-5042 | GAR-HRP Detection Reagents , 500 ml | • | • | | | |
| 170-5047 | GAM-HRP Conjugate , 2 ml | | • | | | |
| 170-5046 | GAR-HRP Conjugate , 2 ml | | • | | | |

* 100 ml substrate provides enough reagents for 800 cm² of membrane; 500 ml substrate provides enough reagents for 4,000 cm² of membrane.

** GAM, goat anti-mouse; GAR, goat anti-rabbit.

*** Detection kits include 1 L 10x TBS, 75 g blocker (nonfat dry milk), 15 ml Tween 20, 2 ml conjugate. 500 ml substrate provides enough reagents for 6,000 cm² of membrane.

Immun-Star AP Chemiluminescence Kits

Pg 199

| Catalog # | Description | Substrate | Enhancer* | Antibody |
|--------------------------------------------|---------------------------------|-----------|-----------|----------|
| Immun-Star AP Kits** and Components | | | | |
| 170-5010 | GAM-AP Detection Kit *** | • | • | • |
| 170-5011 | GAR-AP Detection Kit *** | • | • | • |
| 170-5018 | AP Substrate , 125 ml | • | | |
| 170-5012 | AP Substrate Pack | • | • | |

* The enhancer is used on nitrocellulose blots, but is not optimized for PVDF blots. Additional testing is recommended to determine appropriate conditions for PVDF blots.

** GAM, goat anti-mouse; GAR, goat anti-rabbit.

*** Detection kits provide sufficient reagents to cover 2,500 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

Catalog # Description

Colormetric HRP Detection

Pg 199

Opti-4CN Kits*

170-8235 **Opti-4CN Substrate Kit**

Amplified Opti-4CN Kits*

170-8238 **Amplified Opti-4CN Substrate Kit**

170-8240 **Amplified Opti-4CN Goat Anti-Mouse Detection Kit**

170-8239 **Amplified Opti-4CN Goat Anti-Rabbit Detection Kit**

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

170-6463 **Goat Anti-Rabbit IgG (H + L)-HRP Assay Kit**

170-6464 **Goat Anti-Mouse IgG (H + L)-HRP Assay Kit**

170-6465 **Goat Anti-Human IgG (H + L)-HRP Assay Kit**

Premixed Substrate Reagents

170-6431 **HRP Conjugate Substrate Kit**, contains premixed 4CN, hydrogen peroxide solutions, color development buffer; makes 1 L color development solution

Individual Blotting Substrates

170-6534 **HRP Color Development Reagent**, 4CN, 5 g

170-6535 **HRP Color Development Reagent**, DAB, 5 g

* Each kit contains enough reagent for 2,500 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.

Catalog # Description

Colorimetric AP Detection

Pg 200

Immun-Blot AP Assay Kits with BCIP/NBT*

| | |
|----------|-------------------------------------------|
| 170-6460 | Goat Anti-Rabbit IgG (H + L)-AP Assay Kit |
| 170-6461 | Goat Anti-Mouse IgG (H + L)-AP Assay Kit |
| 170-6462 | Goat Anti-Human IgG (H + L)-AP Assay Kit |

Immun-Blot Amplified AP Accessory

| | |
|----------|------------------------------------------------|
| 170-6404 | Blotting-Grade Blocker, nonfat dry milk, 300 g |
|----------|------------------------------------------------|

Premixed Substrate Reagent Kit

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 170-6432 | AP Conjugate Substrate Kit, contains premixed BCIP and NBT solutions and color development buffer; makes 1 L color development solution |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------|

Individual Blotting Substrates

| | |
|----------|--------------------------------------------------------------------------------------------------------------------|
| 170-6539 | AP Color Development Reagent,** BCIP, 300 mg (reagent necessary for purple color development; also order 170-6532) |
| 170-6532 | AP Color Development Reagent,** NBT, 600 mg (reagent necessary for purple color development; also order 170-6539) |

* Kits contain 0.5 ml of specific AP blotting-grade conjugate; each kit provides reagents (blotting grade TBS buffer, Tween 20 detergent, gelatin blocking reagent, and BCIP and NBT substrate solution) for 200 assays on a 0.6–0.8 x 9.2 cm nitrocellulose strip using a total volume of 5.0 ml.

** Both reagents are necessary for purple color development.

Western Blot Conjugates and Reagents

Blotting-Grade Conjugates and Reagents

Pg 200

| Catalog # | Description | Catalog # | Description |
|-----------------------------------------|------------------------------------------------|-----------|---------------------------------------------------|
| Blotting-Grade Conjugates, HRP | | | |
| 170-6515 | Goat Anti-Rabbit IgG (H + L)-HRP, 2 ml | 170-6522 | Protein A-HRP, 1 ml |
| 170-6516 | Goat Anti-Mouse IgG (H + L)-HRP, 2 ml | 170-6425 | Protein G-HRP, 1 ml |
| 172-1050 | Goat Anti-Human IgG (H + L)-HRP, 2 ml | 170-6528 | Avidin-HRP, 2 ml |
| Blotting-Grade Conjugates, AP | | | |
| 170-6518 | Goat Anti-Rabbit IgG-AP, 1 ml | 170-6521 | Goat Anti-Human IgG-AP, 1 ml |
| 170-6520 | Goat Anti-Mouse IgG-AP, 1 ml | | |
| Detergents and Blocking Reagents | | | |
| 170-6537 | Gelatin, EIA grade, 200 g | 161-0418 | SDS Solution, 20% (w/v), 1 L |
| 170-6404 | Blotting-Grade Blocker, nonfat dry milk, 300 g | 161-0783 | 1x Phosphate Buffered Saline with 1% Casein,* 1 L |
| 170-6531 | Tween 20, EIA grade, 100 ml | 161-0782 | 1x Tris Buffered Saline with 1% Casein,* 1 L |
| 161-0781 | 10% Tween 20, for easy pipetting, 1 L | | |

* Store at 2–8° C.

Total Protein Blot Detection

Catalog # Description

Total Protein Stains

Pg 201

| | |
|----------|--------------------------------------------|
| 170-3127 | SYPRO Ruby Protein Blot Stain, 200 ml |
| 161-0400 | Coomassie Brilliant Blue R-250, 10 g |
| 170-6527 | Colloidal Gold Total Protein Stain, 500 ml |

Preparative Electrophoresis

See Also

Protein sample
preparation kits:
pages 8–11.

Preparative electrophoresis devices fractionate and purify nanogram to gram quantities of proteins or nucleic acids via liquid phase IEF electrophoresis or continuous electroelution from gels. These devices separate and purify molecules according to their molecular mass (using SDS-PAGE or agarose gel electrophoresis), pI (using liquid-phase IEF), or a combination of both molecular mass and pI (using native PAGE or preparative 2-D electrophoresis). These devices include:

- **Rotofor® cell, mini Rotofor cell, and MicroRotofor™ cell** — separate and concentrate proteins into discrete liquid fractions according to their pI by preparative liquid-phase IEF
- **Model 491 prep cell and mini prep cell** — perform high-resolution separations of proteins and nucleic acids by continuous-elution gel electrophoresis (PAGE)
- **Whole gel eluter and mini whole gel eluter** — simultaneously elute and collect protein or nucleic acid fractions from preparative slab gels
- **Model 422 electro-eluter** — elutes macromolecules from gel slices

Preparative Electrophoresis Product Selection Guide

| Product | Page | Method of Purification | Molecules Purified | Run Time | Bulletin |
|--------------------------|------|----------------------------------------|-----------------------------------------------------|-----------|----------|
| Rotofor cell | 205 | IEF | Protein (mg to g) | 2–3 hr | 1903 |
| Mini Rotofor cell | | | Protein (µg to mg) | 2–3 hr | 1903 |
| MicroRotofor cell | | | Protein (µg to mg) | 2–3 hr | 5294 |
| Model 491 prep cell | 206 | SDS-PAGE or native PAGE | Protein (1–500 mg) | 4–10 hr | 1964 |
| Mini prep cell | | | DNA (50–300 µg) RNA (≤1 mg) | | |
| Whole gel eluter | 207 | Electroelution from intact slab gel | Protein (0.5–1,000 µg); RNA (≤100 µg) | 10–30 min | 2108 |
| Mini whole gel eluter | | | Protein (≤50 µg) | | |
| Model 422 electro-eluter | 207 | Electroelution from excised gel pieces | Protein (gel load limits) DNA (≤3 mm thick gels) | 3–5 hr | — |

Preparative IEF Cells

Liquid-phase IEF devices fractionate proteins in free solution according to their pI. This powerful technique offers rapid, simple, and effective purification of even low-abundance proteins from complex protein mixtures. Fractions from a run can be easily collected, pooled, and even refractionated for further purification. Fractionation by liquid-phase IEF is particularly useful for insoluble proteins or those that do not separate well in gel-based IEF media. The pH gradient used for separation is generated by ampholytes, allowing a continuous and customizable pH gradient to be formed. A unique membrane core stabilizes proteins in focused zones and allows collection of protein solutions in each zone without mixing.

Preparative IEF Cell Selection Guide

| | MicroRotofor Cell | Mini Rotofor Cell | Standard Rotofor Cell |
|---------------------------------------------------------|---------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Number of fractions | 10 | 20 | 20 |
| Focusing chamber inner diameter | 13 mm | 19 mm | 30 mm |
| Sample volume | 2.3–2.5 ml | 18 ml | 35–60 ml |
| Fraction volume | 200–250 µl | 0.7 ml | 1.75–3 ml |
| Sample load | Microgram to milligram | Microgram to milligram | Milligram to gram |
| Power conditions required | 1,000 V with 1 W constant | 3,000 V with 12 W constant | 3,000 V with 15 W constant |
| Cooling (2 temperature settings and off position) | Integrated Peltier | Cooling finger (requires external recirculating water chiller); temperature flexible | Cooling finger (requires external recirculating water chiller); temperature flexible |
| Dimensions (W x D x H) | 29.5 x 18.8 x 16 cm | 16.5 x 45.7 x 22.8 cm | 16.5 x 45.7 x 22.8 cm |
| Weight | 4.7 kg (10 lb) | 9 kg (20 lb) | 9 kg (20 lb) |

MicroRotor[™] Cell

Order Info: Pg 208

See AlsoPowerPac HV
power supply:
page 151.MicroRotor for lysis
kits: page 8.

The MicroRotor cell is a preparative IEF device that enables fractionation of small volumes (2.5 ml) of proteins in free solution by their pI. The cell is easy to set up and offers:

- Up to 10-fold concentration of proteins of interest
- Customizable pH gradients — wide or narrow linear pH gradients can be generated using Bio-Lyte[®] ampholytes
- Rapid recovery of proteins focused into 10 liquid fractions
- Integrated temperature regulation to preserve protein structure and function for native separations
- Preassembled disposable focusing chambers

Required Accessory Equipment

Accessory equipment required to run the MicroRotor cell includes a 1,000 V power supply such as the PowerPac[™] HV power supply (which is capable of running at 1 W constant power) and house vacuum. Bio-Lyte[®] ampholytes (page 145) are required to form the internal pH gradient.

**For More Information**

Web: www.bio-rad.com/microrotor

Rotofor[®] Cell and Mini Rotofor Cell

Order Info: Pg 208

See AlsoPowerPac HV
power supply:
page 151.Protein sample
preparation kits:
pages 8–11.

Rotofor and mini Rotofor cells use liquid-phase IEF to separate proteins into 20 fractions in free solution. The Rotofor cell can process up to gram quantities of protein and effectively concentrate them into discrete zones based on pI. In a single run, the Rotofor cell concentrates samples up to 20-fold. Fractions from an initial run can be pooled and refractionated on either the mini Rotofor or MicroRotor[™] cell, resulting in up to 1,000-fold purification. Each focusing step is complete in ≤3 hours. Choose from two sizes: the standard Rotofor chamber purifies milligram to gram quantities of protein in 35–58 ml; the mini Rotofor chamber purifies microgram to milligram quantities in 18 ml. Features of both include:

- Interchangeable cylindrical focusing chambers — enable refractionation of selected fractions for greater purification
- Maintenance of biological activity — a ceramic cooling finger runs through the center of the focusing chamber to dissipate heat
- A customizable pH gradient — wide or narrow linear pH gradients can be generated for specific applications
- Rapid recovery of proteins into 20 focused fractions
- Focusing and enrichment of a protein of interest in 1 or 2 fractions in a single step

Required Accessory Equipment

Accessory equipment required to run the Rotofor cell includes a 3,000 V power supply such as the PowerPac[™] HV power supply, a recirculating water chiller, and house vacuum. Bio-Lyte[®] ampholytes (page 145) are required to form the internal pH gradient.



Rotofor system. The system includes both 18 ml (mini) and 60 ml (standard) focusing chambers, harvesting box, and accessories. It purifies biologically active proteins for sequence analysis, crystallography, and characterization studies.

For More Information

Web: www.bio-rad.com/rotofor

Request or download bulletins: 1903, 3152, and 3160

Preparative PAGE Cells

See Also

PowerPac Universal
and PowerPac HV
power supplies:
page 151.

Model 491 Prep Cell and Mini Prep Cell

Order Info: Pg 209

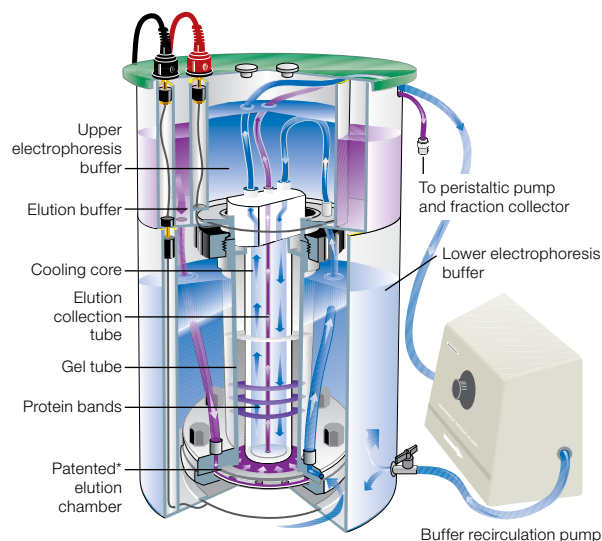
The Model 491 and mini prep cells separate biomolecules (protein or nucleic acids) by continuous-elution electrophoresis. Samples are electrophoresed through a cylindrical gel matrix, where they are separated into ring-shaped bands. As individual bands migrate off the bottom of the gel, they are collected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

Request or download bulletins: 1964, 3153, and 3161



Continuous-elution electrophoresis in the Model 491 prep cell.

Samples are electrophoresed through the cylindrical gel matrix, where they are separated into ring-shaped bands. Individual bands migrate off the bottom of the gel and are collected in discrete liquid fractions available for assay and characterization.

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 μ l |
| 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 |

* U.S. patent 4,877,510.

Preparative Electroelution Cells

Whole Gel Eluter and Mini Whole Gel Eluter

Order Info: Pg 209

The whole gel eluter and patented* mini whole gel eluter are unique electroelution tools that simultaneously elute and collect multiple bands of biomolecules from whole preparative slab gels. Benefits include:

- Rapid, reproducible elutions in 15–20 min
- Elution of native, SDS, or IEF polyacrylamide gels
- Accommodation of gels up to 3.0 mm thick
- Recoveries averaging $\geq 70\%$

For More Information

Web: www.bio-rad.com/electroelution

Request or download bulletins: 2108, 3162, and 3163



Specifications

| | Whole Gel Eluter | Mini Whole Gel Eluter |
|--------------------------|------------------------|----------------------------|
| Number of fractions | 30 | 14 |
| Gel size | $\geq 14 \times 16$ cm | $\geq 6.5 \times 5.5$ cm |
| Minimum gel width | 14 cm | 5.5 cm |
| Gel thickness | 0.75–3 mm | 0.75–3 mm |
| Total elution buffer | 1 L | 500 ml |
| Preparative protein load | ≤ 10 mg | Microgram to low milligram |
| Fraction volumes | 3.0 ml | 0.5 ml |
| Run time | 15–20 min | 15–20 min |
| Power limit | 300 V, 15 W | 200 V, 10 W |
| Recommended power supply | PowerPac™ Basic | PowerPac Basic |
| Dimensions (W x D x H) | 26.7 x 26.7 x 12.7 cm | 15.2 x 15.2 x 12.7 cm |
| Weight | 4.2 kg (9.3 lb) | 2.2 kg (4.8 lb) |

Model 422 Electro-Eluter

Order Info: Pg 210

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) |

* U.S. patent 5,840,169; European patent 92905561.4; Japanese patent 504883/92; Canadian patent 2,130,751.

Preparative Electrophoresis

Preparative IEF Cells

Catalog # Description

MicroRotor Cell Pg 205

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-2800 | MicroRotor Cell Kit , 100/120 V, includes chassis and lid, 2 harvesting trays, 2 focusing chambers, cathode and anode assemblies, 5 cathode (anion exchange) and 5 anode (cation exchange) membranes, sealing tape, assembly tool, cleaning brush, forceps, 3 ml syringe, two 10 ml syringes |
| 170-2801 | MicroRotor Cell Kit , 220/240 V |
| 170-2802 | MicroRotor System with PowerPac HV Power Supply , 100/120 V, includes 170-2800 and 164-5056 |
| 170-2803 | MicroRotor System with PowerPac HV Power Supply , 220/240 V, includes 170-2801 and 164-5056 |

Accessories and Replacement Parts

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-2804 | MicroRotor Starter Kit , includes Bio-Lyte ampholytes, control protein sample, focusing chamber, ion exchange membranes, harvesting tray, syringes |
| 170-2810 | MicroRotor Harvesting Trays , 3 |
| 170-2820 | MicroRotor Sealing Film , 10 sheets |
| 170-2960 | Sealing Tape , 1 roll, 1" x 36 yards |
| 170-2821 | MicroRotor Focusing Chambers , 3 |
| 170-2822 | MicroRotor Cathode Assembly |
| 170-2829 | MicroRotor Anode Assembly |
| 170-2832 | MicroRotor Assembly Tool |
| 170-2833 | MicroRotor Ion Exchange Membrane Assemblies |
| 170-2835 | MicroRotor Cleaning Brush |
| 170-2836 | MicroRotor Syringes , 3 ml and 10 ml, 3 each |
| 170-2850 | MicroRotor Harvesting Station , includes alignment station, needle assembly, needle holder |
| 170-2851 | MicroRotor Needle Assembly |
| 170-2852 | MicroRotor Vacuum Block O-Ring |
| 170-2855 | MicroRotor Lid |
| 170-2826 | MicroRotor Electrode Assembly O-Ring/Gasket Kit , electrolyte buffer chamber O-ring and gaskets |

Rotofor Cell and Mini Rotofor Cell* Pg 205

| | |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-2986 | Rotofor Purification System , 100/120 V, includes 60 ml focusing chamber, 18 ml focusing chamber, starter kit |
| 170-2987 | Rotofor Purification System , 220/240 V |
| 170-2914 | Rotofor Purification System with PowerPac HV Power Supply , 100/120 V, includes 170-2986 and 164-5056 |
| 170-2906 | Rotofor Purification System with PowerPac HV Power Supply , 220/240 V, includes 170-2987 and 164-5056 |
| 170-2950 | Standard Rotofor Cell , 100/120 V, includes 60 ml focusing chamber, starter kit |
| 170-2951 | Standard Rotofor Cell , 220/240 V |
| 170-2988 | Mini Rotofor Cell , 100/120 V, includes 18 ml focusing chamber, starter kit |
| 170-2989 | Mini Rotofor Cell , 220/240 V |
| 170-2910 | Rotofor Starter Kit , includes 10 ml Bio-Lyte ampholytes (pH range 3–10), 60 ml syringe, colored protein sample, 2 vent buttons, one each of the ion exchange membranes, hydrated |
| 170-2919 | Colored Protein Sample , 1 ml (included in Rotofor starter kit) |

Rotofor Adaptor Kits

| | |
|----------|------------------------------------------------------------------------------------------------------------------------------|
| 170-2990 | Adaptor Kit , to convert Rotofor cell to mini Rotofor cell, includes mini focusing chamber, mini membrane core, 18 ml |
| 170-2959 | Adaptor Kit , to convert mini Rotofor cell to Rotofor cell, includes focusing chamber, membrane core, 60 ml |

Accessories and Replacement Parts

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 170-2991 | Mini Membrane Cores , for 18 ml focusing chamber, 2 |
| 170-2952 | Membrane Cores , for 60 ml focusing chamber, 2 |
| 170-2953 | Repair Kit , includes O-ring kit, 4 ion exchange gaskets, 4 port cover screws, 4 electrolyte chamber screws, 2 gray port gaskets |
| 170-2954 | Cooling Finger O-Ring Kit , with 4 O-rings |
| 170-2956 | Ion Exchange Membranes , 5 pair |
| 170-2957 | Vent Buttons , 8 |
| 170-2958 | Cooling Finger |
| 170-2960 | Sealing Tape , 1 roll, 1" x 36 yards |
| 170-2961 | Test Tube Rack |
| 170-2963 | Harvest Box |
| 170-2964 | Harvest Tubing |
| 170-2965 | Harvest Box Lid |
| 170-2966 | Harvesting Needle Array |
| 170-2967 | Anode Electrolyte Chamber , for Rotofor and mini Rotofor cells |
| 170-2968 | Cathode Electrolyte Chamber , for Rotofor and mini Rotofor cells |

* The Rotofor and mini Rotofor cells come with all the necessary parts for initial setup and operation. A repair kit, extra membrane cores, ion exchange membranes, and vent buttons are recommended replacement parts.

Preparative PAGE Cells

Catalog # Description

Model 491 Prep Cell and Mini Prep Cell

Pg 206

Model 491 Prep Cells

| | |
|----------|-------------------------------------------------------------------------------------------------------------------------|
| 170-2926 | Model 491 Prep Cell , 100/120 V, includes buffer recirculation pump, prep cell starter kit with protein standard |
| 170-2927 | Model 491 Prep Cell , 220/240 V |
| 170-2928 | Model 491 Prep Cell without Buffer Recirculation Pump |

Replacement Parts and Accessories for the Model 491 Prep Cell

| | |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-2944 | Prep Cell Casting Stand |
| 170-2929 | Buffer Recirculation Pump , 100/120 V |
| 170-2930 | Buffer Recirculation Pump , 220/240 V |
| 170-2932 | Small Gel Tube Assembly , 28 mm ID |
| 170-2933 | Large Gel Tube Assembly , 37 mm ID |
| 170-2934 | Cooling Finger Assembly , includes feedline connectors |
| 170-2935 | Buffer Circulation Tubing Kit , includes stopcock with tubing and connectors, 3 elution buffer circulation lines and connectors, and electrophoresis/cooling buffer circulation lines and connectors |
| 170-2936 | O-Ring Kits , 2 |
| 170-2937 | Dialysis Membranes , precut, 5 |
| 170-2938 | Frit Kit , includes support frit and elution frit |
| 170-2939 | Sample Application/Overlay Buffer Kit , includes sample loading guide, syringe with Teflon tubing |
| 170-2940 | Thumbscrews , 4 |
| 170-2969 | Lid with Power Cables |
| 161-5101 | Prep Cell Starter Kit |
| 161-0323 | Prep Cell Starter Kit Protein Standard , 1 ml |
| 170-2941 | Elution Manifold Base |

Mini Prep Cells

| | |
|----------|---------------------------------------------------|
| 170-2915 | Mini Prep Cell with Reagent Starter Kit |
| 170-2908 | Mini Prep Cell without Reagent Starter Kit |

Replacement Parts and Accessories for the Mini Prep Cell

| | |
|----------|--------------------------------------------------------------------------|
| 170-2909 | Gel Tubes , 2 |
| 170-2913 | Sample Application/Purge Kit |
| 170-2947 | Peristaltic Pump Adaptor Kit , for 0.8 mm tubing |
| 170-2948 | Elution Frit Kit , with 5 dialysis membranes, MW cutoff 3,500 |
| 170-2911 | Elution Frit Kit , with 5 dialysis membranes, MW cutoff 6,000 |
| 170-2912 | Harvest Ring Assembly , includes Teflon elution collection tubing |
| 170-2917 | Mini Prep Cell Elution Chamber Top |
| 170-2918 | Mini Prep Cell Casting Stand |
| 170-2916 | Elution Manifold Base |
| 800-7533 | Lid with Cables , for mini prep cell |

Preparative Electroelution Cells

Whole Gel Eluter and Mini Whole Gel Eluter

Pg 207

Whole Gel Eluter

| | |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 165-1251 | Whole Gel Eluter with Harvesting Box , includes lid, electrodes, elution chamber core, base, roller, ruler, template, 75 pieces of lower filter paper, 50 pieces of upper filter paper, 50 sealing strips, 25 pieces of cellophane, application note; requires a vacuum source pulling 5" Hg for the harvesting box |
| 165-1250 | Whole Gel Eluter , includes lid, electrodes, elution chamber core, base, roller, ruler, template, 75 pieces of lower filter paper, 50 pieces of upper filter paper, 50 sealing strips, 25 pieces of cellophane, application note |

Whole Gel Eluter Accessories

| | |
|----------|------------------------------------------------------------------|
| 165-1260 | Harvesting Box |
| 165-1270 | Whole Gel Eluter Template |
| 165-1275 | Cellophane , 25 precut sheets |
| 165-1277 | Sealing Tabs , 50 |
| 165-1280 | Lower Chamber Filter Paper , 21 x 21 cm, 75 precut sheets |
| 165-1281 | Upper Chamber Filter Paper , 21 x 21 cm, 50 precut sheets |
| 170-2940 | Thumbscrews , 4 |

Ordering Information

Preparative Electrophoresis

www.bio-rad.com

Catalog # Description

Mini Whole Gel Eluter

- 165-1256 **Mini Whole Gel Eluter with Harvesting Box**, includes lid, electrodes, elution chamber core, base, roller, ruler, template, 50 pieces of lower filter paper, 50 pieces of upper filter paper, 50 sealing tabs, 25 pieces of cellophane, application note; requires a vacuum source pulling 5" Hg for the harvesting box
- 165-1255 **Mini Whole Gel Eluter**, includes lid, electrodes, elution chamber core, base, roller, ruler, template, 50 pieces of lower filter paper, 50 pieces of upper filter paper, 50 sealing tabs, 25 pieces of cellophane, application note

Mini Whole Gel Eluter Accessories

- 165-1261 **Mini Harvesting Box**
- 165-1271 **Mini Whole Gel Eluter Template**
- 165-1276 **Cellophane**, 25 precut sheets
- 165-1278 **Sealing Tabs**, 50
- 165-1282 **Lower Chamber Filter Paper**, 9 x 10 cm, 50 precut sheets
- 165-1283 **Upper Chamber Filter Paper**, 5 x 6 cm, 50 precut sheets

Model 422 Electro-Eluter

Pg 207

- 165-2976 **Model 422 Electro-Eluter**, includes electro-eluter module, membrane caps (MW cutoff 12,000–15,000), glass tubes, frits, silicone adaptors, grommets and stoppers, buffer tank, lid with power cables
- 165-2977* **Model 422 Electro-Eluter Module**, without buffer tank and lid

Accessories

- 165-2985 **Membrane Caps**, clear, MW cutoff 12,000–15,000, 12
- 165-2986 **Membrane Caps**, green, MW cutoff 3,500, 12
- 165-2987 **Frits**, 12
- 165-2978 **Glass Tubes**, 6
- 165-2981 **Silicone Adaptors**, 6
- 165-1988 **Grommets and Stoppers**, 8

* Module can be used with the discontinued Mini-PROTEAN® 3 cell. If you do not own a Mini-PROTEAN 3 cell, order Model 422 electro-eluter catalog #165-2976.

Horizontal Electrophoresis

Bio-Rad offers a complete line of easy-to-use horizontal agarose gel electrophoresis equipment, 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:

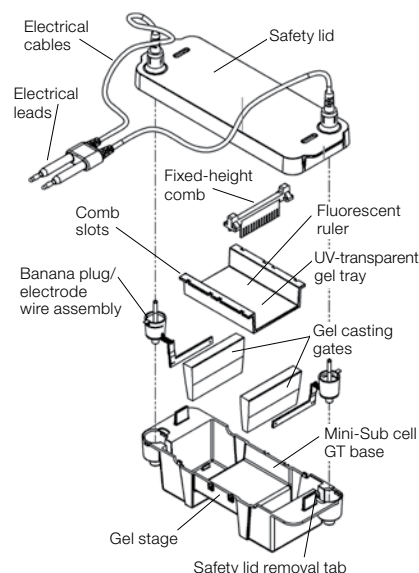
- Sub-Cell® GT cell
- Sub-Cell Model 96 cell
- Sub-Cell Model 192 cell

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



Components of the Mini-Sub cell GT cell.

- Easy-to-replace electrode cassettes
- IEC 1010 (EN 61010) electrical safety certification

For More Information

Web: www.bio-rad.com/horizontalelectro
Request or download bulletin: 2660

See Also

Certified agaroses:
page 142.
PowerPac Basic
power supply:
page 151.
DNA size standards:
pages 137–138.
Premixed
electrophoresis
buffers:
pages 143–144.
Electrophoresis
stains:
pages 179–181.
Gel documentation
systems:
pages 232–237.
ReadyAgarose
precast gels:
page 217.

Sub-Cell Family Selection Guide

| | Mini-Sub Cell GT* | Wide Mini-Sub Cell GT** | Sub-Cell GT | Sub-Cell Model 96 | Sub-Cell Model 192 |
|--------------------------------------------|---------------------------------------|-------------------------------------|------------------------------------------------------|--------------------------|------------------------------------------------------|
| Cell size (W x L x H) | 9.2 x 25.5 x 5.6 cm | 17.8 x 25.5 x 6.8 cm | 18 x 40.5 x 9.4 cm | 29 x 30 x 9 cm | 29 x 40 x 9 cm |
| Gel tray sizes (outside dimensions, W x L) | 7 x 7 cm 7 x 10 cm | 15 x 7 cm 15 x 10 cm | 15 x 10 cm 15 x 15 cm 15 x 20 cm 15 x 25 cm | 25 x 10 cm 25 x 15 cm | 25 x 10 cm 25 x 15 cm 25 x 20 cm 25 x 25 cm |
| ReadyAgarose gels accommodated | Yes (mini format 8-, 12-, 2 x 8-well) | Yes (wide mini and 96 Plus formats) | No | No | No |
| Sample throughput | 8–30*** | 10–60*** | 1–120† | 24–96*** | 24–192† |
| Base buffer volume | ~270 ml | ~650 ml | ~1 L | ~2 L | ~3 L |
| Buffer recirculation | No | No | No | Yes | Yes |
| Bromophenol blue migration (at 75 V) | ~4.5 cm/hr | ~4.5 cm/hr | ~3.0 cm/hr | ~6.2 cm/hr | ~5.2 cm/hr |
| | (at 75 V) | (at 75 V) | (at 75 V) | (at 200 V) | (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. 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. 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, Wide Mini-Sub Cell GT, and Sub-Cell® GT Cells

Mini-Sub® Cell GT Cells



The Mini-Sub cell GT cell can resolve up to 30 samples; its short, narrow format allows 7 and 10 cm runs. 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, a safety lid with cables, and a leveling bubble.

The mini ReadySub-Cell™ GT cell (catalog #170-4487 and #164-0303) is identical to the Mini-Sub cell GT cell, except it is dedicated to running mini ReadyAgarose precast gels. This cell does not include casting gates, tray, or combs. Kits are available to upgrade the ReadySub-Cell GT cell for handcasting capability.

For More Information

Web: www.bio-rad.com/horizontalelectro

Ordering Information

| Catalog # | Casting Gates | Gel Caster | UVTP Tray (cm) | | Combs | | PowerPac Basic Power Supply (164-5050) |
|----------------------------|---------------|------------|----------------|--------|--------|---------|----------------------------------------|
| | | | 7 x 7* | 7 x 10 | 8-Well | 15-Well | |
| Mini-Sub Cell GT Systems** | | | | | | | |
| 170-4406 | • | | • | | • | • | |
| 170-4466 | | | | • | • | • | |
| 170-4486 | • | • | • | | • | • | |
| 170-4467 | | • | | • | • | • | |
| 164-0300 | | • | | • | • | • | • |
| 170-4487 | | | | | | | |
| 164-0303 | | | | | | | • |

Catalog # Description

Mini-Sub Cell GT Accessories

| | | | | | | |
|------------|----------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| 170-4491 | Mini Handcasting Kit , includes 7 x 7 cm casting gates, 15-well 1.5 mm fixed-height comb, 8-well 1.5 mm fixed-height comb | | | | | |
| 170-4422 | Mini-Gel Caster , for Mini-Sub and wide Mini-Sub cell GT systems | | | | | |
| 170-4436* | Sub-Cell GT UV-Transparent Mini-Gel Tray , 7 x 7 cm (trays have 2 slots for fixed-height combs) | | | | | |
| 170-4435 | Sub-Cell GT UV-Transparent Mini-Gel Tray , 7 x 10 cm (trays have 2 slots for fixed-height combs) | | | | | |
| 170-4330** | Original UV-Transparent Mini-Gel Tray , 7 x 10 cm | | | | | |
| 170-4434 | Mini-Sub Cell GT Casting Gates , 2 | | | | | |
| 170-4362 | Mini-Sub Cell GT Anode (Red) Quick Snap Electrode Assembly | | | | | |
| 170-4363 | Mini-Sub Cell GT Cathode (Black) Quick Snap Electrode Assembly | | | | | |
| 170-4331 | Mini-Comb Holder , for Mini-Sub cell adjustable-height combs | | | | | |

| Catalog # | # of Wells | Height† | Thickness, mm | Width of Well, mm | Length of Teeth, mm | Volume, µl (in 5 mm deep gel) |
|-------------------------------------------|------------------------------|------------|---------------|-------------------|---------------------|-------------------------------|
| Combs for Mini-Sub Cell GT Systems | | | | | | |
| 170-4464 | 15 | Fixed | 0.75 | 3 | 10 | 11.25 |
| 170-4465*** | 15 | Fixed | 1.5 | 3 | 10 | 22.5 |
| 170-4332 | 15 | Adjustable | 1.0 | 2.6 | 10.2 | 13 |
| 170-4462 | 8 | Fixed | 0.75 | 5.5 | 11 | 20 |
| 170-4463*** | 8 | Fixed | 1.5 | 5.5 | 11 | 40 |
| 170-4333 | 8 | Adjustable | 1.0 | 5.5 | 10.2 | 27.5 |
| 170-4461 | 2 preparative 2 reference | Fixed | 1.5 | 20 4 | 10 | 150 30 |
| 170-4460 | 1 preparative 2 reference | Fixed | 1.5 | 44 3 | 10 | 330 22.5 |
| 170-4342 | 1 preparative 2 reference | Adjustable | 3 | 43.3 3 | 10.2 | 645 45 |

* Allows casting gels in the cell using casting gates; 7 x 10 gels can be cast with a gel caster. ** Mini-Sub cell systems purchased before 1996 (Mini-Sub DNA cell) require casting tray, catalog #170-4330. This tray is not compatible with the Mini-Sub cell GT system. *** Combs included in systems. † Fixed-height combs must be used with Mini-Sub cell GT system gel trays. Adjustable-height combs require comb holder, catalog #170-4331.

Wide Mini-Sub® Cell GT Cells

The wide Mini-Sub cell GT cell is suited 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 a leveling bubble.

The wide mini ReadySub-Cell™ GT cell (catalog #170-4489 and #164-0304) is identical to the wide Mini-Sub cell GT cell, except it is dedicated to running ReadyAgarose precast gels. This cell does not include casting gates, tray, or combs. Kits are available to upgrade the ReadySub-Cell GT cell for handcasting capability.

For More Information

Web: www.bio-rad.com/horizontalelectro

Ordering Information

| Catalog # | Casting Gates | Gel Caster | UVTP Tray (cm) | | Combs | | PowerPac Basic Power Supply (164-5050) |
|-------------------------------|---------------|------------|----------------|---------|---------|---------|----------------------------------------|
| | | | 15 x 7* | 15 x 10 | 15-Well | 20-Well | |
| Wide Mini-Sub Cell GT Systems | | | | | | | |
| 170-4405 | • | | • | | • | • | |
| 170-4468 | | | | • | • | • | |
| 170-4485 | • | • | • | | • | • | |
| 170-4469 | | • | | • | • | • | |
| 164-0301 | | • | | • | • | • | • |
| 170-4489 | | | | | | | |
| 164-0304 | | | | | | | • |

Catalog # Description

Wide Mini-Sub Cell GT Accessories

| | |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 170-4497 | Wide Mini Handcasting Kit , includes 15 x 7 cm tray, casting gates, 15-well 1.5 mm fixed-height comb, 20-well 1.5 mm fixed-height comb |
| 170-4422 | Mini-Gel Caster , for Mini-Sub and wide Mini-Sub cell GT systems |
| 170-4426 | Sub-Cell GT UV-Transparent Wide Mini-Gel Tray , 15 x 7 cm (trays have 2 slots for fixed-height combs) |
| 170-4416**, *** | Sub-Cell GT UV-Transparent Gel Tray , 15 x 10 cm (trays have 2 slots for fixed-height combs) |
| 170-4425 | Wide Mini-Sub Cell GT Casting Gates , 2 |
| 170-4372 | Wide Mini-Sub Cell GT Anode (Red) Quick Snap Electrode Assembly |
| 170-4373 | Wide Mini-Sub Cell GT Cathode (Black) Quick Snap Electrode Assembly |
| 170-4320 | Comb Holder , for Sub-Cell and wide Mini-Sub Cell adjustable-height combs |

* Allows casting gels in the cell using casting gates; 15 x 10 cm gels can be cast with a gel caster. ** Tray is compatible with the Sub-Cell DNA system. *** 15 x 10 cm gel tray can be used for both wide Mini-Sub cell GT and Sub-Cell GT cells.

Sub-Cell® GT Cell

The 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, making 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, a safety lid with cables, a leveling bubble, and combs (15-well and 20-well). System configurations that include additional accessories are also available.

Horizontal Electrophoresis

Mini-Sub Cell GT, Wide Mini-Sub Cell GT, and Sub-Cell GT Cells

www.bio-rad.com/horizontalelectro

| Ordering Information | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------|----------------|----------|---------|---------|----------------------------------------|
| Catalog # | Casting Gates | Gel Caster | UVTP Tray (cm) | | | | PowerPac Basic Power Supply (164-5050) |
| | | | 15 x 10 | 15 x 15* | 15 x 20 | 15 x 25 | |
| Sub-Cell GT Systems | | | | | | | |
| 170-4401 | | | • | | | | |
| 170-4402 | • | | | • | | | |
| 170-4403 | | | | | • | | |
| 170-4404 | | | | | | • | |
| 170-4481 | | • | • | | | | |
| 170-4482 | • | • | | • | | | |
| 170-4483 | | • | | | • | | |
| 170-4484 | | • | | | | • | |
| 164-0302 | • | • | | • | | | • |
| Catalog # | Description | | | | | | |
| Sub-Cell GT Accessories | | | | | | | |
| 170-4412 | Gel Caster, full size | | | | | | |
| 170-4416** | Sub-Cell GT UV-Transparent Gel Tray, 15 x 10 cm (trays have 2 slots for fixed-height combs) | | | | | | |
| 170-4417* | Sub-Cell GT UV-Transparent Gel Tray, 15 x 15 cm | | | | | | |
| 170-4418 | Sub-Cell GT UV-Transparent Gel Tray, 15 x 20 cm | | | | | | |
| 170-4419 | Sub-Cell GT UV-Transparent Gel Tray, 15 x 25 cm | | | | | | |
| 170-4415 | Sub-Cell GT Casting Gates, 2 | | | | | | |
| 170-4392 | Sub-Cell GT Anode (Red) Quick Snap Electrode Assembly | | | | | | |
| 170-4393 | Sub-Cell GT Cathode (Black) Quick Snap Electrode Assembly | | | | | | |
| 170-4320 | Comb Holder, for Sub-Cell and wide Mini-Sub cell adjustable-height combs | | | | | | |
| * Allows casting gels in the cell using casting gates. Other gel sizes can be cast with a gel caster. ** 15 x 10 cm gel tray can be used for both Sub-Cell GT and wide Mini-Sub cell GT cells. | | | | | | | |

Combs for Sub-Cell® and Wide Mini 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 Sub-Cell and Wide Mini Sub-Cell GT Systems* | | | | | | |
| 170-4449 | 30 | Fixed | 1.5 | 2.7 | 14 | 20.25 |
| 170-4344 | 30 | Adjustable | 1.5 | 2.7 | 19.1 | 20.25 |
| 170-4447 | 20 | Fixed | 0.75 | 5 | 15 | 18.75 |
| 170-4448** | 20 | Fixed | 1.5 | 5 | 15 | 36.3 |
| 170-4321 | 20 | Adjustable | 0.75 | 4.8 | 19.1 | 17 |
| 170-4322 | 20 | Adjustable | 1.5 | 4.8 | 19.1 | 34 |
| 170-4445 | 15 | Fixed | 0.75 | 6 | 15 | 20.7 |
| 170-4446** | 15 | Fixed | 1.5 | 6 | 15 | 45 |
| 170-4323 | 15 | Adjustable | 0.75 | 5.5 | 19.1 | 21 |
| 170-4324 | 15 | Adjustable | 1.5 | 5.5 | 19.1 | 42 |
| 170-4443 | 10 | Fixed | 0.75 | 10 | 14 | 37.5 |
| 170-4444 | 10 | Fixed | 1.5 | 10 | 14 | 75 |
| 170-4325 | 10 | Adjustable | 0.75 | 9.9 | 19.1 | 37 |
| 170-4326 | 10 | Adjustable | 1.5 | 9.9 | 19.1 | 74 |
| Preparative Combs for Sub-Cell GT Systems* | | | | | | |
| 170-4442 | 4 preparative | Fixed | 1.5 | 27 | 14 | 202 |
| | 2 reference | | | 3 | | 22 |
| 170-4441 | 2 preparative | Adjustable | 1.5 | 50 | 14 | 375 |
| | 2 reference | | | 4 | | 30 |
| 170-4440 | 1 preparative | Fixed | 1.5 | 106 | 20 | 795 |
| | 2 reference | | | 4 | | 30 |
| 170-4328 | 1 preparative | Adjustable | 3 | 106 | 19.1 | 1,590 |
| | 2 reference | | | 4 | | 60 |
| Multichannel Pipet-Compatible Combs for Sub-Cell and Wide Mini Sub-Cell GT Systems* | | | | | | |
| 170-4456 | 26 | Fixed | 0.75 | 3 | 15 | 11.25 |
| 170-4457 | 26 | Fixed | 1.5 | 3 | 15 | 22.5 |

continues

Multichannel Pipet-Compatible Combs for Sub-Cell and Wide Mini Sub-Cell GT Systems (cont.)*

| Catalog # | # of Wells | Height | Thickness, mm | Width of Well, mm | Length of Teeth, mm | Volume, μ l (in 5 mm deep gel) |
|-----------|------------|--------|---------------|-------------------|---------------------|------------------------------------|
| 170-4454 | 18 | Fixed | 0.75 | 3 | 14 | 11.25 |
| 170-4455 | 18 | Fixed | 1.5 | 3 | 14 | 22.5 |
| 170-4452 | 14 | Fixed | 0.75 | 6 | 20 | 22.5 |
| 170-4453 | 14 | Fixed | 1.5 | 6 | 20 | 45 |
| 170-4450 | 10 | Fixed | 0.75 | 6 | 14 | 22.5 |
| 170-4451 | 10 | Fixed | 1.5 | 6 | 14 | 45 |

* Fixed-height combs must be used with GT gel trays. Adjustable-height combs require comb holder, catalog #170-4320.

** Combs included in systems.

Sub-Cell® Model 96 Cell



This electrophoresis cell is ideal for medium- to high-throughput analyses because it accommodates two 51-well combs that are also multichannel-pipet compatible. The shorter gel lengths (10 and 15 cm) and 26-well comb also allow the Sub-Cell Model 96 cell to be used for routine applications. This model also contains buffer recirculation ports for applications that require high voltages or extended runs. All Sub-Cell Model 96 systems include a buffer tank, a safety lid with cables, a leveling bubble, and combs (26-well and 51-well). System configurations that include additional accessories are also available.

Ordering Information

| Catalog # | Casting Gates | Gel Caster | UVTP Tray (cm) | | PowerPac Basic Power Supply (164-5050) |
|---------------------------|------------------|------------|----------------|---------|-------------------------------------------|
| | | | 25 x 10" | 25 x 15 | |
| Sub-Cell Model 96 Systems | | | | | |
| 170-4502 | • | | • | | |
| 170-4503 | | | | • | |
| 170-4500 | • | • | • | | |
| 170-4501 | | • | | • | |
| 164-0305 | • | • | • | | • |

Catalog # Description

Sub-Cell Model 96 Accessories

| | |
|-----------|----------------------------------------------------------------------------------------------------------------|
| 170-4514 | Model 96 Gel Caster |
| 170-4521* | Model 96/192 UV-Transparent Gel Tray, 25 x 10 cm |
| 170-4522 | Model 96/192 UV-Transparent Gel Tray, 25 x 15 cm |
| 170-4520 | Model 96/192 Gel Casting Gates, 2 |
| 170-4518 | Model 96/192 Anode (Red) Electrode Assembly |
| 170-4519 | Model 96/192 Cathode (Black) Electrode Assembly |
| 170-4537 | Model 96/192 Buffer Recirculation Kit, includes 2 recirculation port fittings, 6' Tygon tubing, 4 tubing clips |
| 170-4525 | Sub-Cell Models 96 and 192 Comb Holder |

| Catalog # | # of Wells | Height | Thickness, mm | Width of Well, mm | Length of Teeth, mm | Volume, μ l (in 5 mm deep gel) |
|----------------------------------------------------------------|-----------------------------------|--------|---------------|-------------------|---------------------|------------------------------------|
| Adjustable-Height Combs for Sub-Cell Model 96 Systems** | | | | | | |
| 170-4528*** | 51 | — | 0.75 | 3 | 15 | 11.25 |
| 170-4529***,† | 51 | — | 1.5 | 3 | 15 | 22.5 |
| 170-4526*** | 26 | — | 0.75 | 6 | 15 | 22.5 |
| 170-4527***,† | 26 | — | 1.5 | 6 | 15 | 45 |
| 170-4530 | 2 or 4 preparative 2 reference | — | 0.75 | 46 or 98 6 | 15 | 172.5 or 367.5 22.5 |
| 170-4531 | 2 or 4 preparative 2 reference | — | 1.5 | 46 or 98 6 | 15 | 345 or 735 45 |

* 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, catalog #170-4525. Each system includes 1 comb holder.

*** Multichannel-pipet compatible. † Combs included in systems.

Horizontal Electrophoresis

Mini-Sub Cell GT, Wide Mini-Sub Cell GT, and Sub-Cell GT Cells

www.bio-rad.com/horizontalelectro

Sub-Cell® Model 192 Cell



The Sub-Cell Model 192 electrophoresis cell has higher throughput capabilities and is also 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, a safety lid with cables, a leveling bubble, and combs (26-well and 51-well). System configurations that include additional accessories are also available.

Ordering Information

| Catalog # | Casting Gates | Gel Caster | UVTP Tray (cm) | | | | PowerPac Basic Power Supply (164-5050) |
|----------------------------|---------------|------------|----------------|----------|---------|---------|----------------------------------------|
| | | | 25 x 10 | 25 x 15* | 25 x 20 | 25 x 25 | |
| Sub-Cell Model 192 Systems | | | | | | | |
| 170-4508 | | | • | | | | |
| 170-4509 | • | | | • | | | |
| 170-4510 | | | | | • | | |
| 170-4511 | | | | | | • | |
| 170-4504 | | • | • | | | | |
| 170-4505 | • | • | | • | | | |
| 170-4506 | | • | | | • | | |
| 170-4507 | | • | | | | • | |
| 164-0306 | • | • | | • | | | • |

Catalog # Description

Sub-Cell Model 192 Accessories

| | |
|-----------|----------------------------------------------------------------------------------------------------------------|
| 170-4517 | Model 192 Gel Caster |
| 170-4521 | Model 96/192 UV-Transparent Gel Tray, 25 x 10 cm |
| 170-4522* | Model 96/192 UV-Transparent Gel Tray, 25 x 15 cm |
| 170-4523 | UV-Transparent Gel Tray, 25 x 20 cm |
| 170-4524 | UV-Transparent Gel Tray, 25 x 25 cm |
| 170-4520 | Model 96/192 Gel Casting Gates, 2 |
| 170-4518 | Model 96/192 Anode (Red) Electrode Assembly |
| 170-4519 | Model 96/192 Cathode (Black) Electrode Assembly |
| 170-4537 | Model 96/192 Buffer Recirculation Kit, includes 2 recirculation port fittings, 6' Tygon tubing, 4 tubing clips |
| 170-4525 | Sub-Cell Models 96 and 192 Comb Holder |

| Catalog # | # of Wells | Height | Thickness, mm | Width of Well, mm | Length of Teeth, mm | Volume, µl (in 5 mm deep gel) |
|-----------------------------------------------------------------|--------------------|--------|---------------|-------------------|---------------------|-------------------------------|
| Adjustable-Height Combs for Sub-Cell Model 192 Systems** | | | | | | |
| 170-4528*** | 51 | — | 0.75 | 3 | 15 | 11.25 |
| 170-4529***,† | 51 | — | 1.5 | 3 | 15 | 22.5 |
| 170-4526*** | 26 | — | 0.75 | 6 | 15 | 22.5 |
| 170-4527***,† | 26 | — | 1.5 | 6 | 15 | 45 |
| 170-4530 | 2 or 4 preparative | — | 0.75 | 46 or 98 | 15 | 172.5 or 367.5 |
| | 2 reference | — | | 6 | | 22.5 |
| 170-4531 | 2 or 4 preparative | — | 1.5 | 46 or 98 | 15 | 345 or 735 |
| | 2 reference | — | | 6 | | 45 |

* 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, catalog #170-4525. Each system includes 1 comb holder. *** Multichannel-pipet compatible. † Combs included in systems.

ReadyAgarose™ Precast Gel System

ReadyAgarose precast gels are prepared in gel trays designed to fit securely in Mini-Sub® cell GT and wide Mini-Sub cell GT cells (pages 212–213). They come in a choice of 27 gel types, including ReadyAgarose 96 Plus gels, which resolve DNA fragments from 20 to 20,000 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 horizontal electrophoresis 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/horizontalelectro; to download ReadyAgarose 96 Plus wizard, go to www.bio-rad.com/software
Request or download bulletins: 2647 and 2980

See Also

Certified agaroses: page 142.

Nucleic acid stains: page 181.

Model 785 vacuum blotter: page 189.

PowerPac Basic and PowerPac HC power supplies: page 151.

Freeze 'N Squeeze DNA spin columns: page 6.

Ordering Information

| Description | 8-Well | 12-Well | 2 x 8-Well |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|
| Mini ReadyAgarose Gels, TBE | | | |
| 1.0% plus ethidium bromide | 161-3004 | 161-3010 | — |
| 3.0% plus ethidium bromide | 161-3006 | 161-3012 | — |
| Mini ReadyAgarose Gels, TAE | | | |
| 1.0% | 161-3015 | — | 161-3057 |
| 1.0% plus ethidium bromide | 161-3016 | 161-3022 | — |
| 3.0% | 161-3017 | — | — |
| 3.0% plus ethidium bromide | 161-3018 | 161-3024 | — |
| Description | 20-Well | 32-Well | 2 x 32-Well |
| Wide Mini ReadyAgarose Gels, TBE | | | |
| 1.0% plus ethidium bromide | 161-3028 | 161-3034 | 161-3038 |
| 3.0% plus ethidium bromide | 161-3030 | 161-3036 | 161-3040 |
| Wide Mini ReadyAgarose Gels, TAE | | | |
| 1.0% plus ethidium bromide | 161-3044 | 161-3050 | 161-3054 |
| 3.0% plus ethidium bromide | 161-3046 | 161-3052 | 161-3056 |
| Description | 4 x 26-Well (96 Plus) | | |
| ReadyAgarose 96 Plus Gels, TBE | | | |
| 1.0% plus ethidium bromide | 161-3060 | | |
| 3.0% plus ethidium bromide | 161-3062 | | |
| ReadyAgarose 96 Plus Gels, TAE | | | |
| 1.0% plus ethidium bromide | 161-3063 | | |
| 3.0% plus ethidium bromide | 161-3065 | | |
| Catalog # | Description | | |
| ReadySub-Cell GT Cells for ReadyAgarose Gels | | | |
| 170-4487 | Mini ReadySub-Cell GT Cell , includes buffer tank, lid and electrodes, leveling bubble; accommodates 8-well and 12-well mini ReadyAgarose gels | | |
| 170-4489 | Wide Mini ReadySub-Cell GT Cell , includes buffer tank, lid and electrodes, leveling bubble; accommodates 20-well, 32-well, and 2 x 32-well wide mini ReadyAgarose gels | | |
| Premixed Electrophoresis Buffers | | | |
| 161-0733 | 10x Tris/Boric Acid/EDTA (TBE) , 1 L | | |
| 161-0770 | 10x Tris/Boric Acid/EDTA (TBE) , 5 L cube | | |
| 161-0741 | 10x Tris/Boric Acid/EDTA (TBE) , extended range, 1 L | | |
| 161-0743 | 50x Tris/Acetic Acid/EDTA (TAE) , 1 L | | |
| 161-0773 | 50x Tris/Acetic Acid/EDTA (TAE) , 5 L cube | | |
| Application Guide | | | |
| 161-3000 | ReadyAgarose Instruction Manual , free upon request with ReadyAgarose gel purchase | | |

Pulsed Field Gel Electrophoresis

Pulsed field gel electrophoresis (PFGE) resolves large DNA molecules by alternating the electrical field between spatially distinct pairs of electrodes, causing DNA molecules as large as several megabases to reorient and move at different speeds through the pores in an agarose gel. Bio-Rad offers three CHEF systems that incorporate different PFGE technologies for optimal resolution in various size ranges (see CHEF Systems Selection Guide below).

Agaroses, Reagents, and Standards for PFGE

Bio-Rad offers a comprehensive line of agaroses (page 142), standards (page 138), and markers (page 138), buffers (pages 143–144), and other reagents to make PFGE simple and convenient. See page 220 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 to 360° | 90 to 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

Order Info: Pg 221

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 eight blocks of programming each

Application Versatility

- Ability to choose any pulse angle from 0 to 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

CHEF-DR® III Variable Angle System

Order Info: Pg 221

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 to 120° for separations of DNA molecules ranging from 100 bp to 10 Mb
- Selection of optimal voltage gradient, switch time, and angle for specific DNA size ranges
- Ability to program up to three consecutively executing blocks of run conditions

**For More Information**

Web: www.bio-rad.com/chef3

Request or download bulletin: 1796

*U.S. patent 5,549,796.

CHEF-DR® II Chiller System

Order Info: Pg 221

The CHEF-DR II chiller system resolves DNA fragments in the 5 kb–6 Mb range. This 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



CHEF Genomic DNA Plug Kits

Order Info: Pg 221

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.



Agaroses and Standards for Pulsed Field Gel Electrophoresis

Order Info: Pg 222

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 142 for agaroses, page 138 for size standards, and pages 143–144 for buffers.

Pulsed Field Gel Electrophoresis

| Catalog # | Description | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| CHEF Mapper XA System* | | Pg 219 |
| 170-3670 | CHEF Mapper XA System , 120 V, includes power module, embedded auto-algorithm for protocol optimization, interactive algorithm program disk, electrophoresis cell, cooling module, variable-speed pump, Tygon tubing (12'), 14 x 13 cm (W x L) casting stand, 15-well 1.5 mm comb and comb holder, screened cap, disposable plug molds, leveling bubble, cables, <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 | |
| 170-3671 | CHEF Mapper XA System , 100 V, for Japan | |
| 170-3672 | CHEF Mapper XA System , 220 V, for Asia Pacific/Europe | |
| 170-3673 | CHEF Mapper XA System , 240 V, for Asia Pacific/Europe | |
| CHEF-DR III Variable Angle System* | | Pg 219 |
| 170-3700 | CHEF-DR III Variable Angle System , 120 V, includes power module, electrophoresis cell, cooling module, variable-speed pump, 14 x 13 cm casting stand with frame and platform, comb holder, 15-well 1.5 mm thick comb, screened cap, disposable plug molds, 12' Tygon tubing, 2 plugs <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 | |
| 170-3702 | CHEF-DR III Variable Angle System , 220/240 V, for Asia Pacific/Europe | |
| 170-3703 | CHEF-DR III Variable Angle System , 100 V, for Japan | |
| CHEF-DR II Chiller System* | | Pg 220 |
| 170-3725 | CHEF-DR II System , 120 V, includes electrophoresis cell, drive module, cooling module, control module, variable-speed pump, 14 x 13 cm casting stand with frame and platform, comb holder, 15-well 1.5 mm thick comb, screened cap, disposable plug molds, 12' Tygon tubing, 2 plugs <i>S. cerevisiae</i> DNA size standards, 5 g pulsed field Certified agarose, 5 g Certified megabase agarose, for North America | |
| 170-3727 | CHEF-DR II System , 220/240 V, for Asia Pacific/Europe | |
| 170-3728 | CHEF-DR II System , 100 V, for Japan | |
| CHEF System Accessories* | | |
| 170-3654 | Cooling Module , 120 V, for North America | |
| 170-3688 | Cooling Module , 100 V, for Japan | |
| 170-3655 | Cooling Module , 220/240 V, for Asia Pacific/Europe | |
| 170-3644 | Variable-Speed Pump , 120 V | |
| 170-3648 | Electrodes , thick gauge (0.02"), 6 | |
| 170-3711 | Screened Caps , 5 | |
| 170-3713 | 50-Well Disposable Plug Molds , enough for 250 plugs | |
| 170-3622 | Reusable Plug Mold , 10 plug | |
| 170-3689 | Standard Casting Stand , includes 14 x 13 cm frame and platform | |
| 170-3704 | Wide/Long Combination Casting Stand , includes 21 x 14 cm frame and platform | |
| 170-3699 | Combination Comb Holder | |
| 170-4326 | 10-Well Adjustable-Height Comb , 1.5 mm | |
| 170-4325 | 10-Well Adjustable-Height Comb , 0.75 mm | |
| 170-4324 | 15-Well Adjustable-Height Comb , 1.5 mm | |
| 170-4323 | 15-Well Adjustable-Height Comb , 0.75 mm | |
| 170-4322 | 20-Well Adjustable-Height Comb , 1.5 mm | |
| 170-4344 | 30-Well Adjustable-Height Comb , 1.5 mm | |
| 170-3627 | 15-Well Comb , 21 cm wide, 1.5 mm thick | |
| 170-3628 | 30-Well Comb , 21 cm wide, 1.5 mm thick | |
| 170-3645 | 45-Well Comb , 21 cm wide, 1.5 mm thick | |
| 170-3623 | Preparative Comb , 14 cm wide, 1.5 mm thick, with 2 outer wells for size standards | |
| 170-4046 | Leveling Table , 20 x 30 cm | |
| 170-3643 | Gel Scoop | |
| * All accessories are compatible with CHEF-DR II and DR III systems. A comprehensive listing of replacement parts can be found at www.bio-rad.com . | | |
| CHEF Genomic DNA Plug Kits | | Pg 220 |
| 170-3591 | CHEF Mammalian Genomic DNA Plug Kit , contains 12 ml cell suspension buffer, 1.3 ml proteinase K, 30 ml proteinase K reaction buffer, 12 ml 2% CleanCut agarose, 60 ml 10x wash buffer, screened cap, 2 disposable plug molds; makes 100 plugs | |
| 170-3592 | CHEF Bacterial Genomic DNA Plug Kit , contains 12 ml cell suspension buffer, 1.3 ml proteinase K, 30 ml proteinase K reaction buffer, 12 ml 2% CleanCut agarose, 60 ml 10x wash buffer, 1.6 ml lysozyme (25 mg/ml), 30 ml lysozyme buffer, screened cap, 2 disposable plug molds; makes 100 plugs | |
| 170-3593 | CHEF Yeast Genomic DNA Plug Kit , contains 12 ml cell suspension buffer, 1.3 ml proteinase K, 30 ml proteinase K reaction buffer, 12 ml 2% CleanCut agarose, 60 ml 10x wash buffer, 1.6 ml lyticase, 25 ml lyticase buffer, screened cap, 2 disposable plug molds; makes 100 plugs | |
| 170-3594 | CleanCut Agarose , 2%, 12 ml | |

Ordering Information

Pulsed Field Gel Electrophoresis

www.bio-rad.com

Catalog #

Description

Agaroses and Standards for Pulsed Field Gel Electrophoresis

Pg 138, 142

Agaroses and Size Standards for PFGE

| | |
|----------|-------------------------------------------------------------------------------------------------------|
| 161-3108 | Certified Megabase Agarose, 25 g |
| 161-3109 | Certified Megabase Agarose, 125 g |
| 161-3110 | Certified Megabase Agarose, 500 g |
| 161-3100 | Certified Molecular Biology Agarose, 25 g |
| 161-3101 | Certified Molecular Biology Agarose, 125 g |
| 161-3102 | Certified Molecular Biology Agarose, 500 g |
| 162-0137 | Pulsed Field Certified Agarose, 100 g |
| 162-0138 | Pulsed Field Certified Agarose, 500 g |
| 170-3605 | CHEF DNA Size Marker, <i>S. cerevisiae</i> , 0.2–2.2 Mb, 5 agarose blocks, sufficient for 25–40 plugs |
| 170-3667 | CHEF DNA Size Marker, <i>H. wingei</i> , 1–3.1 Mb, 5 agarose blocks, sufficient for 25–40 plugs |
| 170-3633 | CHEF DNA Size Marker, <i>S. pombe</i> , 3.5–5.7 Mb, 5 agarose blocks, sufficient for 25–40 plugs |
| 170-3624 | CHEF DNA Size Standard, 5 kb ladder, 4.9–120 kb, 20–25 lanes |
| 170-3707 | CHEF DNA Size Standard, 8.3–48.5 kb, 125 lanes |
| 170-3635 | CHEF DNA Size Standard, lambda ladder, 0.05–1 Mb, 5 agarose blocks, sufficient for 25–40 plugs |

Premixed Nucleic Acid Electrophoresis Buffers

| | |
|----------|-------------------------------------------|
| 161-0733 | 10x Tris/Boric Acid/EDTA (TBE), 1 L |
| 161-0770 | 10x Tris/Boric Acid/EDTA (TBE), 5 L cube |
| 161-0743 | 50x Tris/Acetic Acid/EDTA (TAE), 1 L |
| 161-0773 | 50x Tris/Acetic Acid/EDTA (TAE), 5 L cube |

Mutation Analysis

DCode™ Universal Mutation Detection System

Order Info: Pg 227

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 and 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 patented* cam-operated manual gradient former creates linear gradient gels for the DCode system. It mixes and delivers high- and low-density solutions without using a peristaltic pump or magnetic stirrer. The gradients formed are linear and reproducible.

WinMelt™ Software Optimizes Primer Placement

Windows-based WinMelt software predicts the melting profile of any DNA sequence up to 3,200 bases (Lerman and Silverstein 1987). Placement of primers and GC clamps can be optimized by analysis of the placement effect on the DNA melting profile. WinMelt (Windows XP system compatibility) software is recommended for all DGGE, CDGE, and TTGE applications.

An interactive CD-ROM describes the principles of DGGE, CDGE, TTGE, and SSCP (Training Guide, catalog #170-9241) and includes videos on setting up and using the DCode system, a WinMelt software tutorial, DCode application notes, instruction manual, and other literature.

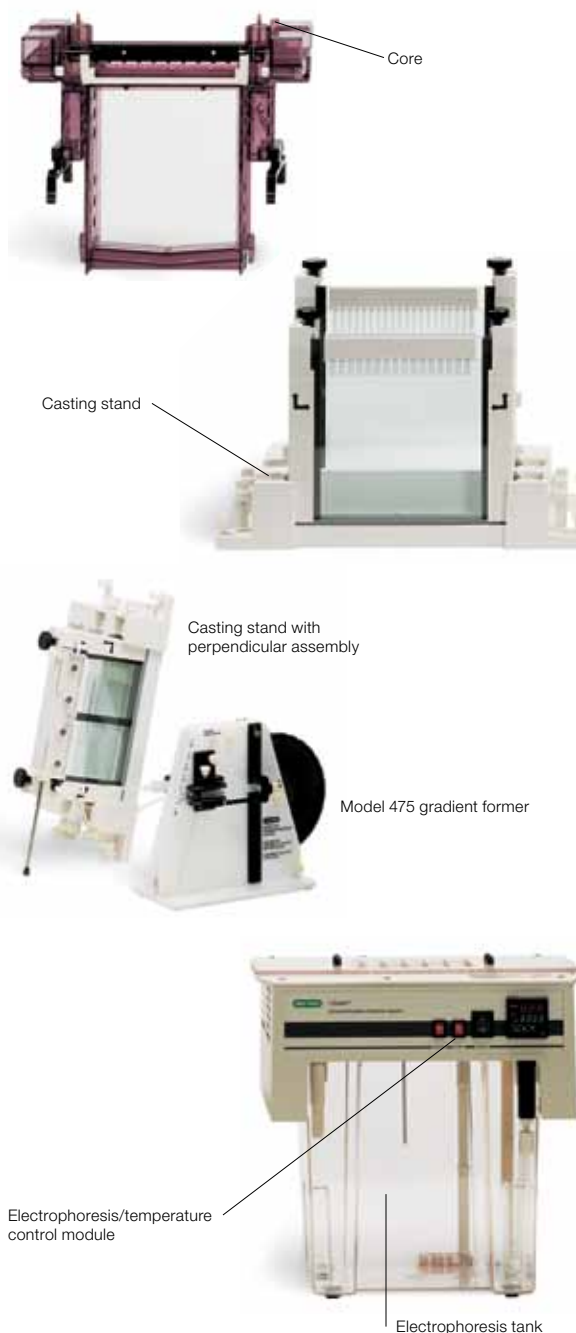
For More Information

Web: www.bio-rad.com/dcode

For examples of DCode system applications, including screening for mutations in the Fas antigen of lymphoma tumors and mutations such as K-ras and p53, and for examples of monitoring microbial diversity in environmental samples using the DCode system, request bulletin 5479 (CD-ROM). For more information on the DCode system and accessories, request or download bulletins 2069 and 2100.

For complete ordering information, request or download bulletin 2100.

* U.S. patent 5,540,498.



See Also

Nucleic acid amplification: pages 296–319.

PowerPac Basic and PowerPac HV power supplies: page 151.

Acrylamide: page 141.

Premixed buffers: pages 143–144.

Nucleic Acid Sequencing

Sequi-Gen® GT Sequencing Cell

Order Info: Pg 228

The system's design ensures smile-free patterns and offers an easy horizontal casting method. Four different IPC sizes fit into the space-saving universal base/lower buffer chamber for the Sequi-Gen GT cell. The 38 x 30 cm size is wide enough to accommodate 100 samples, but short enough for applications that do not require long run times.

- Problem-free horizontal gel casting — lever-operated clamps facilitate rapid assembly and gel casting without tape or grease
- Selection of combs and spacers to meet primary application needs
- Modular design includes a universal transparent base for all Sequi-Gen cell sizes
- Unique upper buffer chamber design allows heat dissipation, maintains uniform temperature, and eliminates smile patterns
- IEC 1010 safety certification



For More Information

Web: www.bio-rad.com/nasequencing

Request or download bulletin: 2160

Specifications

| IPC Dimensions | Gel Area | Minimum Buffer Volume | | Recommended Constant Power* | Expected Voltage* | Expected Current* | Expected Temperature* |
|----------------|--------------|-----------------------|--------|-----------------------------|-------------------|-------------------|-----------------------|
| | | Upper | Lower | | | | |
| 21 x 40 cm | 17 x 40 cm | 500 ml | 350 ml | 40 W | 1,600 V | 25 mA | 50°C |
| 21 x 50 cm | 17 x 50 cm | 550 ml | 350 ml | 50 W | 2,000 V | 25 mA | 50°C |
| 38 x 30 cm | 34.5 x 30 cm | 700 ml | 350 ml | 70 W | 2,200 V | 32 mA | 50°C |
| 38 x 50 cm | 34.5 x 50 cm | 1,400 ml | 350 ml | 80 W | 2,500 V | 32 mA | 50°C |

* Typical electrophoresis conditions for a 0.4 mm, 6% acrylamide gel in 1x TBE buffer.

Combs and Spacers for the Sequi-Gen® Cell

Order Info: Pg 228

Machined Vinyl Sharktooth Combs and Spacers

Spacers (0.4 mm thick) are available in 30, 40, and 50 cm lengths.

Multichannel Pipet (MP)-Compatible Combs

Multichannel pipet-compatible well spacing is available in sharktooth and well-forming formats. MP sharktooth combs come with 34, 68, or 100 teeth and are 0.4 mm thick.

Machined Vinyl Wedge Spacers

The use of wedge spacers results in a gel that becomes gradually thicker toward the bottom, resulting in bands more closely spaced at the bottom. Wedge spacers eliminate the need for buffer gradient gels.

Plastic Combs and Spacers

Plastic combs and spacers are 0.4 mm thick. Well-forming combs are 14 or 31 cm wide.

Gel Drying Systems

Bio-Rad offers flexible gel drying systems that will accommodate multiple gel types and allow optimization of drying conditions.

For More Information

Web: www.bio-rad.com/geldrying

Model 583 and HydroTech™ Gel Drying Systems

Order Info: Pg 229

See Also

Precast gels:
pages 157–158,
161–162.

Acrylamide: page 141.

Premixed buffers:
pages 143–144.

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

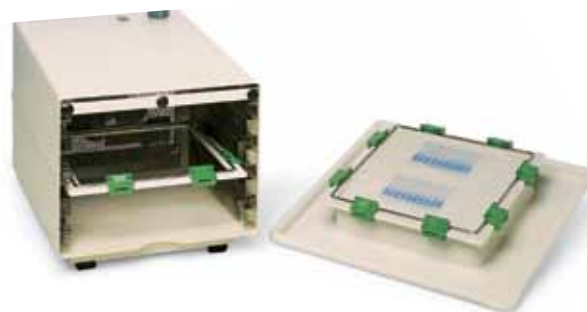
* U.S. patent 5,582,509. The HydroTech vacuum pump is not suitable for rotary evaporation or general aspiration.

GelAir™ Drying System

Order Info: Pg 230

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 x 20 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 x 43 x 30 cm |
| Weight | 8 kg (18 lb) |

GelAir Drying Frames

| | |
|--------------------------|-------------------------------------------------------------------------------------|
| Inner dimensions | 20 x 20 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 x 7 cm) gels, 2 Criterion™ (13.3 x 8.7 cm) gels, 1 large (20 x 20 cm) gel |

Mutation Analysis

Catalog # Description

DCode Universal Mutation Detection System

Pg 223

DCode Systems*

| | |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-9080 | DCode System for DGGE , 120 V, for 16 cm gels with single prep well (1 mm), includes comb gasket, 2 sets of clamps, Model 475 gradient former, all parts required to cast gradient gels |
| 170-9081 | DCode System for DGGE , 220/240 V, for 16 cm gels with single prep well (1 mm) |
| 170-9082 | DCode System for DGGE , 100 V, for 16 cm gels with single prep well (1 mm) |
| 170-9083 | DCode System for DGGE , 120 V, for 10 cm gels with 2 prep wells (1 mm) |
| 170-9084 | DCode System for DGGE , 220/240 V, for 10 cm gels with 2 prep wells (1 mm) |
| 170-9085 | DCode System for DGGE , 100 V, for 10 cm gels with 2 prep wells (1 mm) |
| 170-9086 | DCode System for CDGE , 120 V, for 16 cm gels with 20 wells (1 mm) |
| 170-9087 | DCode System for CDGE , 220/240 V, for 16 cm gels with 20 wells (1 mm) |
| 170-9088 | DCode System for CDGE , 100 V, for 16 cm gels with 20 wells (1 mm) |
| 170-9089 | DCode System for TTGE , 120 V, for 16 cm gels with 20 wells (1 mm) |
| 170-9090 | DCode System for TTGE , 220/240 V, for 16 cm gels with 20 wells (1 mm) |
| 170-9091 | DCode System for TTGE , 100 V, for 16 cm gels with 20 wells (1 mm) |
| 170-9092 | DCode System for SSCP , 120 V, for 20 cm gels with 20 wells (0.75 mm), includes cooling tank adaptor for use with external cooling bath, control reagents for SSCP |
| 170-9093 | DCode System for SSCP , 220/240 V, for 20 cm gels with 20 wells (0.75 mm) |
| 170-9094 | DCode System for SSCP , 100 V, for 20 cm gels with 20 wells (0.75 mm) |
| 170-9105** | Complete DCode System , 120 V, PC, for all gel sizes and types described above, includes software, standard and cooling tanks, Model 475 gradient former, sandwich clamps, pressure clamp, comb gasket and holder, fittings required for gradient gels |
| 170-9106** | Complete DCode System , 220/240 V, PC |
| 170-9107** | Complete DCode System , 100 V, PC |

Adaptor Kits***

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-9125 | DGGE Kit , for 16 cm gels with single prep well (1 mm), includes sandwich clamps, pressure clamp, comb gasket and holder, fittings required for gradient gel casting |
| 170-9126 | DGGE Kit , for 10 cm gels with 2 prep wells (1 mm) |
| 170-9127 | CDGE/TTGE Kit , for 16 cm gels with 20 prep wells (1 mm) |
| 170-9128 | Complete SSCP Kit , for 20 cm gels with 20 wells (0.75 mm), includes sandwich clamps, cooling finger adaptor for use with external chiller |
| 170-9129 | Basic SSCP Kit , for 20 cm gels with 20 wells (0.75 mm), includes sandwich clamps |

Accessories†

| | |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-9240 | WinMelt Software , PC/Windows |
| 170-9241 | Interactive CD-ROM Training Guide |
| 170-9042 | Model 475 Gradient Delivery System , includes cam-operated manual gradient former, 2 each of 10 and 30 ml syringes, all accessories required to cast gradient gels |
| 170-9140 | Electrophoresis Cooling Tank , with cooling adaptor for hookup to laboratory recirculating chiller |

Electrophoresis Reagents and DNA Control Reagents

| | |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 170-9150 | DCode Control Reagent Kit for DGGE/CDGE/TTGE , includes primers (one GC-clamped) and DNA templates for production of wild-type and mutant DNA |
| 170-9151 | DCode Control Reagent Kit for SSCP , includes primers and DNA templates for production of wild-type and mutant DNA |
| 170-9170 | DCode Electrophoresis Reagent Kit for DGGE , includes 500 ml 40% acrylamide/bis (37.5:1), 2 x 1 L 50x TAE buffer, 225 ml 100% deionized formamide, 10 ml 10 mg/ml ethidium bromide, 10 ml DCode dye solution, 5 ml TEMED, 1 ml 2x gel loading dye, 10 g ammonium persulfate |
| 170-9171 | DCode Electrophoresis Reagent Kit for TTGE , includes 500 ml 40% acrylamide/bis (37.5:1), 1 kg urea, 2 x 1 L 50x TAE buffer, 10 ml 10 mg/ml ethidium bromide, 1 ml 2x gel loading dye, 5 ml TEMED, 10 g ammonium persulfate |
| 170-9172 | DCode Electrophoresis Reagent Kit for SSCP , includes 500 ml 40% acrylamide solution, 500 ml 2% bis-acrylamide solution, 100 ml glycerol, 6 x 1 L 10x TBE buffer, 2x SSCP gel loading dye, 5 ml TEMED, 10 g ammonium persulfate |

* Each system includes electrophoresis/temperature control module, sandwich core, kit to cast gels of indicated size and type (2 sets of plates, 2 sets of clamps and spacers, 2 combs), control reagents for indicated application(s).

** For PC, includes WinMelt software.

*** Each kit includes 2 sets of plates, 2 sets of spacers, 2 combs.

† For a complete list of accessories, including combs and spacers, for the DCode system, go to www.bio-rad.com/dcode.

Nucleic Acid Sequencing

Catalog # Description

Sequi-Gen GT Sequencing Cell*

Pg 224

| | |
|----------|----------------------------------------------------------------------------------------------|
| 165-3860 | Sequi-Gen GT System, 21 x 40 cm |
| 165-3861 | Sequi-Gen GT System, 21 x 50 cm |
| 165-3862 | Sequi-Gen GT System, 38 x 30 cm |
| 165-3863 | Sequi-Gen GT System, 38 x 50 cm |
| 165-3802 | Sequi-Gen GT System and PowerPac HV Power Supply, 21 x 40 cm, includes 165-3860 and 164-5056 |
| 165-3803 | Sequi-Gen GT System and PowerPac HV Power Supply, 21 x 50 cm, includes 165-3861 and 164-5056 |
| 165-3810 | Sequi-Gen GT System and PowerPac HV Power Supply, 38 x 30 cm, includes 165-3862 and 164-5056 |
| 165-3804 | Sequi-Gen GT System and PowerPac HV Power Supply, 38 x 50 cm, includes 165-3863 and 164-5056 |

Accessories

| | |
|------------|-------------------------------------------------------------------------------------------------------------------------|
| 165-3870** | Sequi-Gen GT IPC Assembly, 21 x 40 cm |
| 165-3871** | Sequi-Gen GT IPC Assembly, 21 x 50 cm |
| 165-3872** | Sequi-Gen GT IPC Assembly, 38 x 30 cm |
| 165-3873** | Sequi-Gen GT IPC Assembly, 38 x 50 cm |
| 165-3880 | Sequi-Gen GT IPC, 21 x 40 cm, includes bonded inner glass plate and electrical components |
| 165-3881 | Sequi-Gen GT IPC, 21 x 50 cm, includes bonded inner glass plate and electrical components |
| 165-3882 | Sequi-Gen GT IPC, 38 x 30 cm, includes bonded inner glass plate and electrical components |
| 165-3883 | Sequi-Gen GT IPC, 38 x 50 cm, includes bonded inner glass plate and electrical components |
| 165-3866 | Sequi-Gen GT Universal Base |
| 165-3878 | Precision Caster Assembly, 21 cm, includes precision caster base, precision caster gasket, syringe, tubing, luer tapers |
| 165-3879 | Precision Caster Assembly, 38 cm, includes precision caster base, precision caster gasket, syringe, tubing, luer tapers |
| 165-3886 | Precision Caster Base, 21 cm |
| 165-3887 | Precision Caster Base, 38 cm |
| 165-3888 | Precision Caster Gasket, 21 cm |
| 165-3889 | Precision Caster Gasket, 38 cm |
| 165-3892 | Precision Caster Syringe, 140 ml |
| 165-3720 | Gel Temperature Indicators, 5 |

* Sequi-Gen GT systems include IPC assembly (see following footnote), universal base, safety covers with cables, stabilizer bar, precision caster assembly, 0.40 mm vinyl sharktooth comb and spacers, gel temperature indicator, leveling bubble, drain port connector. Systems with PowerPac HV power supply include temperature probe.

** IPC assemblies include bonded inner glass plate, outer glass plate, lever clamp set.

Combs and Spacers for the Sequi-Gen Cell

Pg 224

| Catalog # | Thickness, mm | # of Wells | Approximate Well Volume, μ l | Width, cm |
|-----------------------------------------|---------------|------------|----------------------------------|-----------|
| MP-Compatible Sharktooth Combs | | | | |
| 165-3845 | 0.4 | 34 | 5.0 | 15 |
| 165-3846 | 0.4 | 68 | 5.0 | 30 |
| 165-3847 | 0.4 | 100 | 3.7 | 30 |
| MP-Compatible Well-Forming Combs | | | | |
| 165-3848 | 0.4 | 34 | 4.8 | 15 |
| 165-3849 | 0.4 | 68 | 4.8 | 30 |
| Machined Vinyl Sharktooth Combs | | | | |
| 165-3836 | 0.4 | 24 | 7.3 | 15 |
| 165-3837 | 0.4 | 36 | 5.0 | 15 |
| 165-3838 | 0.4 | 48 | 3.7 | 15 |
| 165-3839 | 0.4 | 49 | 7.3 | 30 |
| 165-3840 | 0.4 | 73 | 5.0 | 30 |
| 165-3841 | 0.4 | 97 | 3.7 | 30 |
| Plastic Well-Forming Combs | | | | |
| 165-3684 | 0.4 | 16 | 42.5 | 14 |
| 165-3686 | 0.4 | 20 | 31.0 | 14 |
| 165-3688 | 0.4 | 36 | 3.6 | 14 |
| 165-3692 | 0.4 | 32 | 30.0 | 31 |
| 165-3694 | 0.4 | 44 | 5.5 | 31 |
| 165-3696 | 0.4 | 60 | 3.5 | 31 |
| 165-3698 | 0.4 | 80 | 4.0 | 31 |

continues

| Catalog # | Thickness, mm | # of Wells | Approximate Well Volume, µl | Width, cm |
|---------------------------------------------------|---------------|---------------|-----------------------------|-----------|
| Plastic Sharktooth Combs | | | | |
| 165-3700 | 0.4 | 24 | 7.3 | 15 |
| 165-3702 | 0.4 | 48 | 3.7 | 15 |
| Catalog # | Length, cm | Thickness, mm | | |
| Machined Vinyl Sharktooth Spacers (2 per package) | | | | |
| 165-3812 | 30 | 0.4 | | |
| 165-3814 | 40 | 0.4 | | |
| 165-3816 | 50 | 0.4 | | |
| Machined Vinyl Wedge Spacers (2 per package) | | | | |
| 165-3821 | 40 | 0.4–1.2 | | |
| 165-3823 | 50 | 0.4 | | |
| Plastic Spacers (10 per package) | | | | |
| 165-3710 | 40 | 0.4 | | |
| 165-3712 | 50 | 0.4 | | |

Gel Drying Systems

| Catalog # | Description | Pg 225 |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Model 583 and HydroTech Gel Drying Systems | | |
| 165-1789 | HydroTech Gel Drying System , 100/120 V, includes 165-1745 and 165-1781 | |
| 165-1790 | HydroTech Gel Drying System , 220/240 V, includes 165-1746 and 165-1782 | |
| 165-1745 | Model 583 Gel Dryer , 100/120 V, includes porous gel support, transparent sealing gasket, filter paper backing, cellophane membrane backing, sequencing gel filter paper | |
| 165-1746 | Model 583 Gel Dryer , 220/240 V | |
| HydroTech Vacuum Pumps | | |
| 165-1781 | HydroTech Vacuum Pump , 100/120 V, includes pump, quick disconnect fittings for 1/4 and 3/8" ID vacuum tubing, vacuum tubing, drain tubing | |
| 165-1782 | HydroTech Vacuum Pump , 220/240 V | |
| HydroTech Vacuum Pump Accessories | | |
| 165-1783 | Quick Disconnect Fitting , fits 1/4" ID tubing | |
| 165-1784 | Quick Disconnect Fitting , fits 3/8" ID tubing | |
| 165-1785 | Vacuum Tubing , 2 m, includes quick disconnect fitting, hose clamps, 2-way stopcock | |
| 165-1786 | Drain Tubing , 2 m, includes quick disconnect fitting, hose clamp | |
| 910-0509 | 2-Way Stopcock | |
| 165-1787 | 3-Way Stopcock | |
| 165-1788 | HydroTech Vacuum Gauge | |
| 165-1791 | Anti-Foam Agent , 100 ml | |
| Double-Up Gel Drying Rack and Systems | | |
| 165-1796 | Double-Up Gel Dryer Rack | |
| 165-1797 | Double-Up Gel Dryer System , 100/120 V, includes 2 Model 583 gel dryers (165-1745), HydroTech vacuum pump (165-1781), double-up gel dryer rack (165-1796) | |
| 165-1798 | Double-Up Gel Dryer System , 220/240 V, includes 2 Model 583 gel dryers (165-1746), HydroTech vacuum pump (165-1782), double-up gel dryer rack (165-1796) | |
| Model 583 Drying Supports | | |
| 165-0962 | Filter Paper Backing , for stained gels, 35 x 45 cm, 25 sheets | |
| 165-0963 | Cellophane Membrane Backing , clear membrane for transmission densitometry or overhead projection, 35 x 45 cm, 50 sheets | |
| 165-0959 | Sequencing Gel Filter Paper , for fragile sequencing gels, 35 x 45 cm, 25 sheets | |
| 165-1747 | Model 583 Gel Dryer Porous Gel Support , 35 x 45 cm | |
| 165-1748 | Model 583 Transparent Sealing Gasket , 41 x 51 cm | |
| Drying Supports for Discontinued Products | | |
| 165-0922 | Cellophane Membrane Backing , 18 x 34 cm, for Model 224, 443, and 543 slab gel dryers, 50 sheets | |
| 165-0921 | Thick Blot Paper , 18 x 34 cm, for Model 224, 443, and 543 slab gel dryers, 25 sheets | |
| Gel Drying Solution | | |
| 161-0752 | Gel Drying Solution , 1 L | |

Ordering Information

Gel Drying Systems

www.bio-rad.com

Catalog # Description

GelAir Drying System

Pg 226

| | |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 165-1771 | GelAir Drying System , 115 V, 60 Hz, includes 165-1777, 2 drying frames, 16 clamps, assembly table, 50 precut sheets of cellophane support, gel drying solution |
| 165-1772 | GelAir Drying System , 230 V, 50 Hz, includes 165-1778, 2 drying frames, 16 clamps, assembly table, 50 precut sheets of cellophane support, gel drying solution |
| 165-1777 | GelAir Dryer , 115 V, 60 Hz, gel drying oven only |
| 165-1778 | GelAir Dryer , 230 V, 50 Hz, gel drying oven only |

Accessories

| | |
|----------|-----------------------------------------------------------------------------------------------------|
| 165-1775 | GelAir Drying Frames , includes plastic drying frame, metal square frame, 16 clamps |
| 165-1776 | GelAir Assembly Table |
| 920-7965 | GelAir Plastic Drying Frame , for GelAir assembly table, does not include metal square frame |
| 165-1779 | GelAir Cellophane Support , 50 precut sheets |
| 165-1780 | GelAir Drying Frame Clamps , 8 |
| 161-0752 | Gel Drying Solution , 1 L |