

# ELECTROPHORESIS

## Criterion™ TGX™ Precast Gels

Get superior results with convenient, fast Criterion TGX gels:

- Run in as little as 20 min
- Blot transfer times as short as 15 min
- Use standard Laemmli buffers and reagents
- Inexpensive buffer system, low running costs
- Accurate molecular weight estimation
- Robust system for difficult samples

## Accelerated Electrophoresis with Faster Run Times and Increased Sample Throughput

### Introduction

The new Criterion TGX (Tris-Glycine eXtended) precast gels for PAGE are based on a novel modification of the Laemmli system, which allows the gels to be run in as little as 20 min at 300 V while maintaining low temperatures and high performance. The TGX gels use standard sample and Tris/glycine/SDS running buffers and retain Laemmli-like separation characteristics. The TGX formulation increases gel stability and extends shelf life to 12 months with exceptionally reproducible results.

Criterion TGX gels are currently available in 7.5%, 10%, 12%, 18%, 4–15%, 4–20%, 8–16%, 10–20%, 10.5–14%, 15% and Any kD™, which offers optimal resolution of proteins in the 20–100 kD molecular weight range and is ideal for 2-D PAGE.

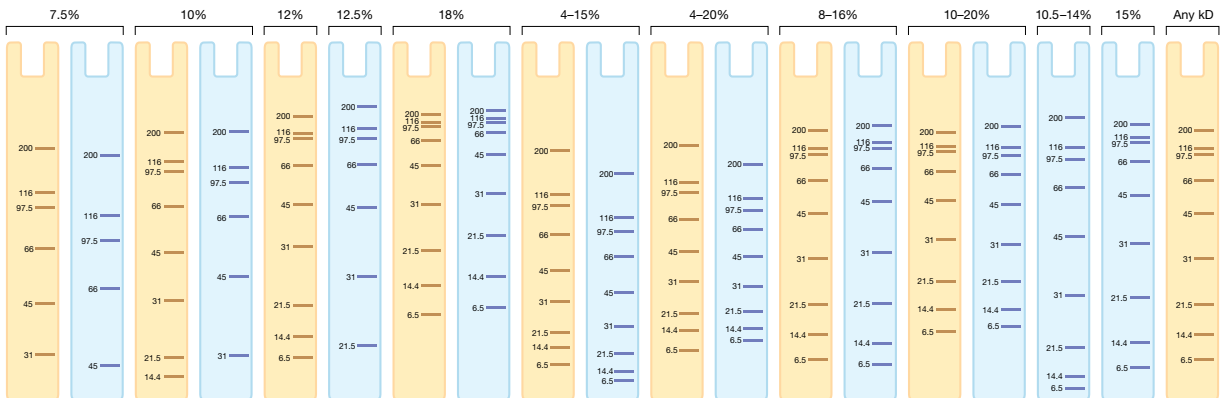


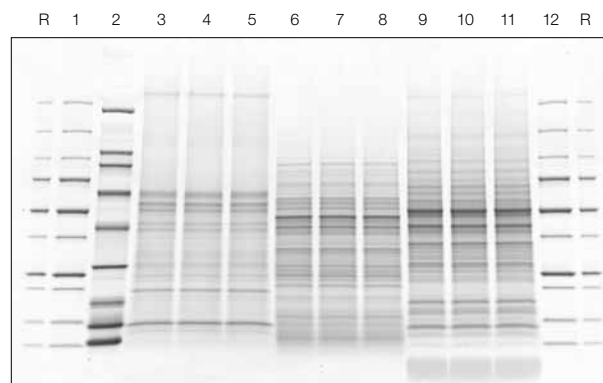
Fig. 1. Criterion TGX ( ) versus Criterion Tris-HCl ( ) gel migration charts. Broad range, unstained standards.



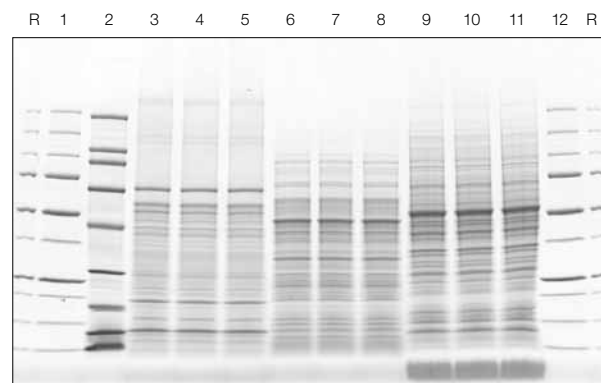
## Short Run Times

Criterion TGX gels can be run in as little as 20 min at 300 V without compromising performance. The gels maintain cooler temperatures than other gels when run at elevated voltages, providing unmatched run times. Furthermore, Criterion TGX gels provide superior performance compared to Life Technologies' Tris-glycine and Bis-Tris midi gels, which show band distortions and a decrease in resolution when run at 300 V (Figure 2).

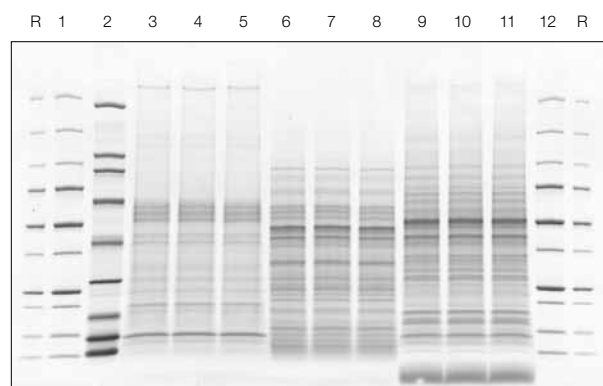
**Criterion TGX 4–20% Gel**



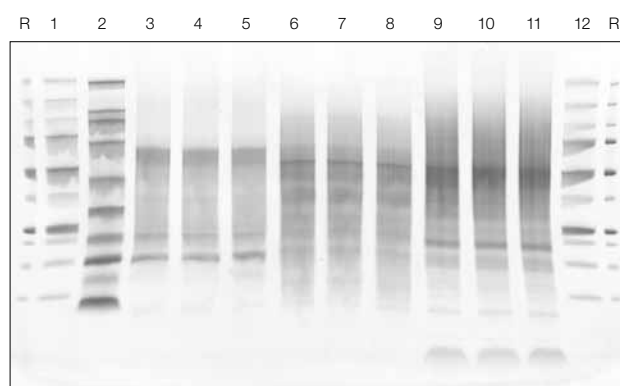
**Novex Tris-Glycine 4–20% Gel**



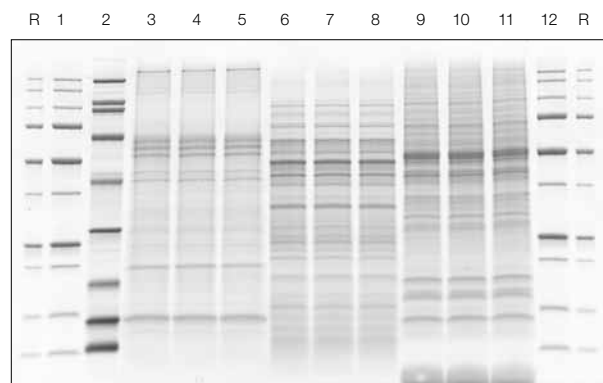
**Criterion TGX 4–15% Gel**



**NuPAGE 4–12% Gel**



**Criterion TGX Any kD Gel**



**Fig. 2. Comparison of Criterion TGX gels with Life Technologies' NuPAGE Bis-Tris or Novex Tris-glycine gels at 300 V.** All gels were loaded as follows: outer reference lanes (R), 3  $\mu$ l Precision Plus Protein™ Dual Color standards; lanes 1 and 12, 10  $\mu$ l Precision Plus Protein™ Dual Color standards; lane 2, 10  $\mu$ l unstained SDS-PAGE broad range standards; lanes 3–5, 15  $\mu$ l mouse liver extract; lanes 6–8, 15  $\mu$ l *E. coli* lysate; lanes 9–11, 15  $\mu$ l mouse brain extract. Following electrophoresis the gels were stained with Bio-Safe™ Coomassie stain.

## Downstream Applications

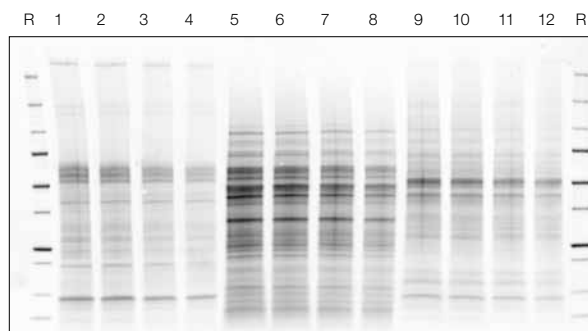
Criterion TGX gels deliver superior staining with low background. These gels are compatible with all commonly used stains and mass spectrometry applications.

## Greater Transfer Efficiency

Criterion TGX precast gels provide fast and excellent transfer efficiency using either wet/tank or semi-dry transfer systems. The proteins from the gel can be transferred onto a PVDF or nitrocellulose membrane in as little as 15 min at 150 V versus the standard 60 min at 100 V (Figure 3).

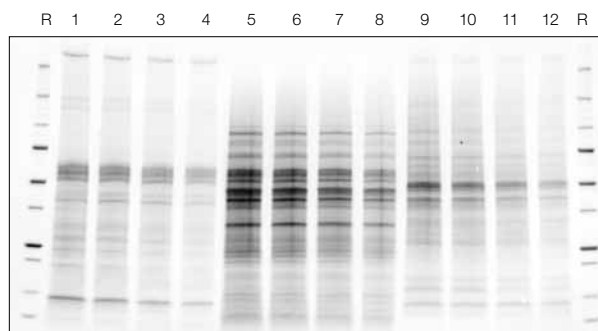
### 4–20% Criterion TGX Precast Gels Transferred at 100 V for 1 Hr

Blot stain (protein transferred to nitrocellulose membrane)



### 4–20% Criterion TGX Precast Gels Transferred at 150 V for 15 Min

Blot stain (protein transferred to nitrocellulose membrane)



**Fig. 3. Accelerated blotting of Criterion TGX gels.** Criterion TGX 4–20% gels were loaded as follows: outer reference lanes (R), 3  $\mu$ l Precision Plus Protein Unstained standards. A gradient of sample load volumes was used for the following samples: lanes 1–4, mouse liver extract; lanes 5–8, *E. coli* lysate; lanes 9–12, mouse brain extract. Gels were run in a Criterion cell at 300 V for 20 min and then transferred onto a nitrocellulose membrane using Towbin buffer (with 20% methanol) in a Criterion blotter at either 100 V for 1 hr or 150 V for 15 min. The blots were stained using SYPRO Ruby blot stain.

## Specifications

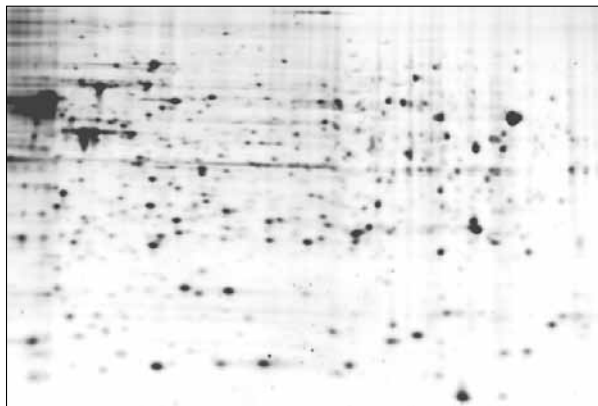
### Criterion TGX Stain-Free Gels

Gel dimensions (Width $\times$ Length $\times$ Thickness)	13.3 $\times$ 8.7 $\times$ 0.1 cm
Cassette dimensions (Width $\times$ Length $\times$ Thickness)	15.0 $\times$ 10.6 $\times$ 0.53 cm
Cassette material	Styrene copolymer
Comb material	Polycarbonate
Gel storage conditions	Store flat at 4°C; do not freeze
Shelf life at 4°C*	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 (catalog #161-0737)
Recommended running buffer	Tris/Glycine/SDS running buffer: 25 mM Tris, 192 mM glycine, 0.1% SDS, pH 8.3 (catalog #161-0732)
Run times at:	
200 V	42–50 min
300 V	20–26 min

\* From date of manufacture.

### Introducing a Unique Gel for a Wide Range of Protein Separations

The Any kD formulation is unique and provides separation from 10–250 kD with the best resolution in the 20–100 kD range. As a result, Any kD gels can be used for screening samples or for 2-D applications aimed at rapid proteomics analysis (Figure 4).

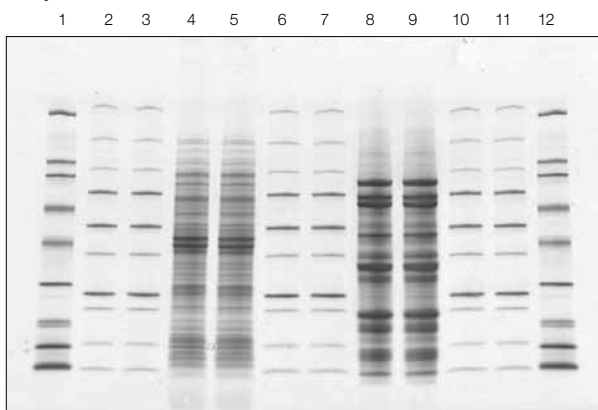


**Fig. 4. 2-D analysis of HeLa cell lysate using a Criterion TGX Any kD gel.** 80 µg HeLa cell lysate was run on an 11 cm IPG strip (pH 5–8) followed by separation on a Criterion TGX Any kD gel run at 200 V for 45 min. The gel was stained with Flamingo™ fluorescent gel stain.

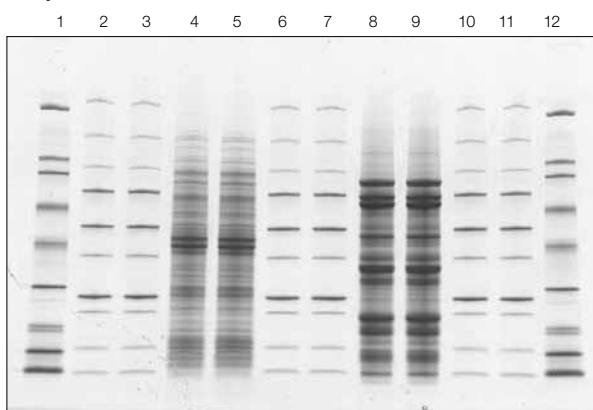
### Consistent Performance

Criterion TGX chemistry is a modified Laemmli formulation that ensures the stability of the gel matrix for more than 12 months. The new precast gels deliver superior resolution and reproducibility through the entire shelf life of the precast gel. The gels shown in Figure 5 were stored at 37°C for varying time periods to demonstrate their consistent performance over time (1 day at 37°C is equivalent to 1 month at 4°C).

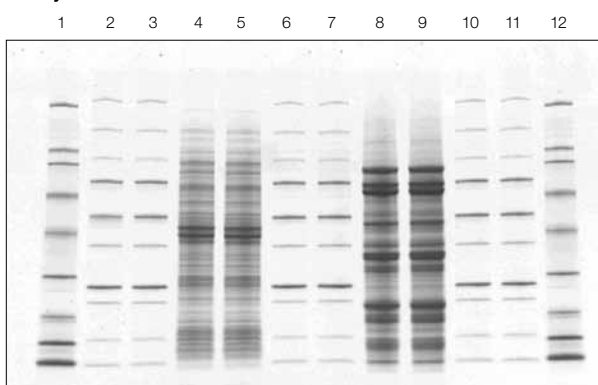
0 days at 37°C



6 days at 37°C



13 days at 37°C

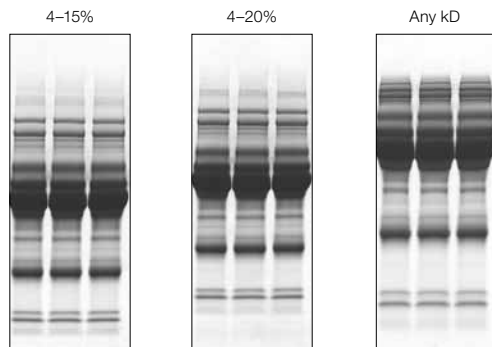


**Fig. 5. Performance of Criterion TGX gels following prolonged storage at 37°C.** Freshly prepared 4–20% Criterion TGX gels were incubated at 37°C for the amount of time indicated. Following incubation, the gels were loaded as follows: lanes 1 and 12, broad range SDS-PAGE standards; lanes 2–3, 6–7, and 10–11, Precision Plus Protein Unstained standards; lanes 4–5, *E. coli* lysate; lanes 8–9, soy extract. The reference lanes were not used. Following electrophoresis at 200 V, gels were stained with Bio-Safe Coomassie stain and scanned with the GS-800™ calibrated densitometer.

## Sample Load Tolerance

Overloading SDS-PAGE gels results in vertical streaking and impaired resolution. Criterion TGX gels exhibit band symmetry and resolution even in overloaded lanes (Figure 6). The increased dynamic range of these gels enables the analysis of both high- and low-abundance species in the same sample.

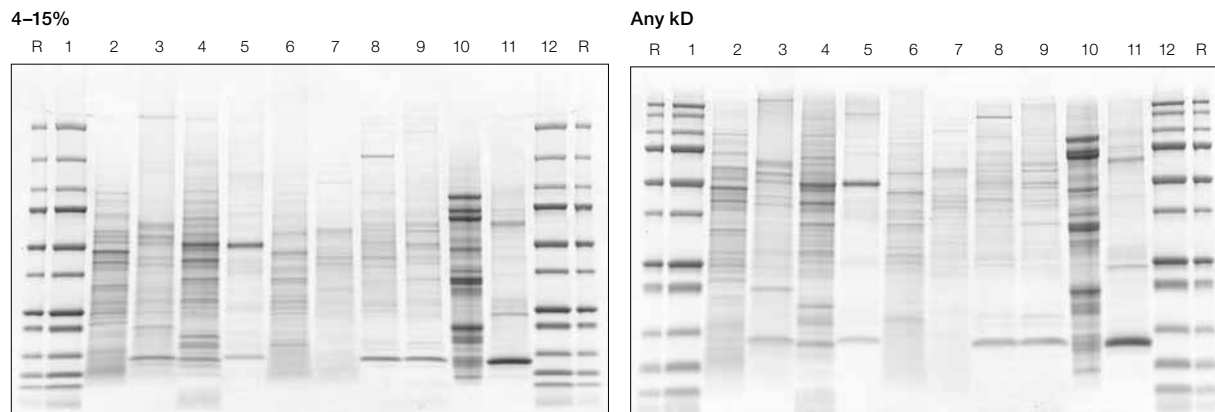
### Criterion TGX Gel



**Fig. 6. Gel performance when overloaded with mouse serum.** Mouse serum was diluted 20-fold into Laemmli sample buffer. Samples were loaded in a volume of 25  $\mu$ l and run at 200 V. Gels were stained with Bio-Safe Coomassie stain and scanned with a GS-800 calibrated densitometer.

## Robust PAGE System

Criterion TGX precast gels can handle a wide variety of samples and sample compositions. The gels deliver well-defined straight lanes with symmetrical band shapes regardless of sample composition (Figure 7).



**Fig. 7. Superior resolution of a variety of samples.** Criterion TGX 4–15% and Any kD gels were loaded as follows: outer reference lanes (R) and lanes 1 and 12, Precision Plus Protein Dual Xtra standards; lane 2, *E. coli* extract; lane 3, mouse liver extract; lane 4, mouse brain extract; lane 5, spinach extract; lane 6, yeast extract; lane 7, *Bacillus subtilis* extract; lane 8, rat liver extract; lane 9, mouse adrenal cortex extract; lane 10, soy extract; lane 11, mouse pituitary extract. All gels were run at 200 V. Following electrophoresis the gels were stained with Bio-Safe Coomassie stain.

## Related Literature

- 4110001 Instruction Manual, Criterion Gel Application Guide
- 5981 Criterion Tris-HCl to Criterion TGX and TGX Stain-Free™ Precast Gels Catalog Number Conversion Chart
- 6032 Life Technologies Bis-Tris and Tris-Glycine to Criterion TGX/TGX Stain-Free Precast Gels Conversion Chart

## Ordering Information

Description	12+2*-Well 45 µl	18-Well 30 µl	26-Well 15 µl	Prep+2*-Well 800 µl	IPG+1*-Well 11 cm IPG Strip
<b>Criterion TGX Gels**</b>					
7.5%	567-1023	567-1024	567-1025	—	—
10%	567-1033	567-1034	567-1035	—	—
12%	567-1043	567-1044	567-1045	—	—
18%	567-1073	567-1074	567-1075	567-1072	567-1071
4–15%	567-1083	567-1084	567-1085	567-1082	567-1081
4–20%	567-1093	567-1094	567-1095	567-1092	567-1091
8–16%	567-1103	567-1104	567-1105	567-1102	567-1101
10–20%	567-1113	567-1114	567-1115	567-1112	567-1111
Any kD	567-1123	567-1124	567-1125	567-1122	567-1121

\* Reference well accommodates 15 µl of markers/standards.

\*\* Criterion TGX gels are sold as a single gel.

Catalog #	Description	Catalog #	Description
<b>Criterion Cell and Systems</b>		<b>Silver Stain</b>	
165-6001	<b>Criterion Cell</b> , includes electrophoresis buffer tank, lid with power cables, 3 sample loading guides (12+2-well, 18-well, 26-well)	161-0449	<b>Silver Stain Plus™ Kit</b> , includes fixative enhancer concentrate, silver complex solution, reduction moderator solution, image development reagent, development accelerator reagent; stains 13 full size or 40 mini gels
165-6019	<b>Criterion Cell and PowerPac™ Basic Power Supply</b> , 100–120/220–240 V, includes 165-6001 and 164-5050	161-0443	<b>Silver Stain Kit</b> , includes oxidizer concentrate, silver reagent concentrate, silver stain developer; stains 20 full size or 48 mini gels
165-6020	<b>Criterion Cell and Single-Row AnyGel™ Stand</b> , includes 165-6001 and 165-4131	<b>Flamingo Stain</b>	
<b>Criterion Cell and Blotter Systems</b>		161-0490	<b>Flamingo Fluorescent Gel Stain</b> , 10× solution, 20 ml
165-6024	<b>Criterion Cell/Plate Blotter System</b> , includes 165-6001 and 170-4070	161-0491	<b>Flamingo Fluorescent Gel Stain</b> , 10× solution, 100 ml
165-6025	<b>Criterion Cell/Wire Blotter System</b> , includes 165-6001 and 170-4071	161-0492	<b>Flamingo Fluorescent Gel Stain</b> , 10× solution, 500 ml
<b>Criterion™ Dodeca™ Cell and Systems</b>		<b>Protein Standards</b>	
165-4130	<b>Criterion Dodeca Cell</b> , includes electrophoresis buffer tank with built-in cooling coil, lid with power cables	<b>Precision Plus Protein Standards</b>	
165-4138	<b>Criterion Dodeca Cell and PowerPac HC Power Supply</b> , includes 165-4130 and 164-5052	161-0363	<b>Precision Plus Protein Unstained Standards</b> , 1 ml, 100 applications
165-4139	<b>Criterion Dodeca Cell and PowerPac Universal Power Supply</b> , includes 165-4130 and 164-5070	161-0373	<b>Precision Plus Protein All Blue Standards</b> , 500 µl, 50 applications
165-5133	<b>Criterion Dodeca Cell and 6-Row AnyGel Stand</b> , includes 165-4130 and 165-5131	161-0374	<b>Precision Plus Protein Dual Color Standards</b> , 500 µl, 50 applications
<b>Buffers and Reagents</b>		161-0375	<b>Precision Plus Protein™ Kaleidoscope™ Standards</b> , 500 µl, 50 applications
<b>Sample Buffers</b>		161-0376	<b>Precision Plus Protein™ WesternC™ Standards</b> , 250 µl, 50 applications
161-0737	<b>Laemmli Sample Buffer</b> , 30 ml	161-0385	<b>Precision Plus Protein WesternC Pack**</b> , 50 applications
161-0738	<b>Native Sample Buffer</b> , 30 ml	<b>Natural Unstained Standards</b>	
161-0610	<b>Dithiothreitol (DTT)</b> ,* 1 g	161-0303	<b>SDS-PAGE Standards</b> , high range, 200 µl
161-0710	<b>2-Mercaptoethanol</b> , 25 ml	161-0304	<b>SDS-PAGE Standards</b> , low range, 200 µl
<b>Running Buffers</b>		161-0317	<b>SDS-PAGE Standards</b> , broad range, 200 µl
161-0732	<b>10x Tris/Glycine/SDS</b> , 1 L	* Store desiccated at 2–8°C; store other reagents at room temperature, dry, and away from direct sunlight. Hazardous shipping charges may apply.	
161-0734	<b>10x Tris/Glycine</b> , 1 L	** Each pack includes 250 µl of Precision Plus Protein WesternC standards and 125 µl of StrepTactin-HRP conjugate.	
161-0416	<b>SDS Solution</b> , 10% (w/v), 250 ml	Coomassie is a trademark of BASF Aktiengesellschaft. NuPAGE, Novex, and SYPRO are registered trademarks of Life Technologies.	
161-0418	<b>SDS Solution</b> , 20% (w/v), 1 L	Bio-Rad Laboratories Inc. is licensed by Invitrogen Corporation to sell SYPRO products for research use only, under U.S. patent 5,616,502.	
<b>Stains</b>		StrepTactin is covered by German patent application P 19641876.3. Bio-Rad Laboratories, Inc. is licensed by Institut für Bioanalytik GmbH to sell these products for research use only.	
<b>Bio-Safe Coomassie Stain</b>		Precision Plus Protein standards are sold under license from Life Technologies Corporation, Carlsbad CA for use only by the buyer of the product. The buyer is not authorized to sell or resell this product or its components.	
161-0786	<b>Bio-Safe Coomassie Stain</b> , 1 L		
161-0787	<b>Bio-Safe Coomassie Stain</b> , 5 L		
<b>Oriole™ Fluorescent Gel Stain</b>			
161-0495	<b>Oriole Fluorescent Gel Stain</b> , 1×, 200 ml		
161-0496	<b>Oriole Fluorescent Gel Stain</b> , 1×, 1 L		
161-0497	<b>Oriole Fluorescent Gel Stain</b> , kit for 5 L		

For additional products or product sizes, please refer to the Bio-Rad catalog or visit [www.bio-rad.com](http://www.bio-rad.com).



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