

UNIQUE PROTEIN GEL CHEMISTRIES FOR YOUR EVERY NEED

PROTEIN DETECTION



Protein biology

Choose the right protein gel to get publication-quality results the first time

Choice without compromise

With a focus on your evolving protein research needs, we offer you a complete array of products to support rapid, reliable protein electrophoresis optimized for a variety of applications, whether it's at the first or last step in your workflow.

All of our precast protein gels are designed to deliver superior performance, reliability, reproducibility, and consistency of quality. We stand behind our gel quality with our Protein Gels Performance Guarantee.* Our extensive portfolio of precast protein gels provides a wide variety of gel options available for your research.

Whether your protein is 2.5 kDa or as large as 500 kDa, or you're looking for separation under native conditions or by isoelectric point—or you wish to identify protease activity—we have the right gel for your application.

Use this brochure to compare gel chemistries, learn about the benefits you can expect from each, and select recommended protein ladders to enable better-quality protein separation results.

* For Terms and Conditions of the performance guarantee, go to [thermofisher.com/proteingelguarantee](https://www.thermofisher.com/proteingelguarantee)

Contents



Overview	4
Broad molecular weight protein separation: Bis-Tris and Tris-glycine chemistries	6
High molecular weight protein separation: Tris-acetate chemistry	11
Low molecular weight protein separation: Tricine chemistry	12
Native protein gel electrophoresis: Bis-Tris chemistry	13
Gel tanks and protein stains	14
Protein ladders and total protein normalization	15
Protein mini gel migration charts	16-17
Welcome packs and power supplies	18

Overview

Four optimized precast gel chemistries

Our precast protein gels are offered in four different chemistries. The choice of whether to use one chemistry or another depends on the abundance of the protein you're separating, the size of the protein, and your downstream application, as illustrated in the selection guide on the following page.

For separation of a broad range of proteins, two chemistries, Bis-Tris and Tris-glycine, have been optimized for performance and long shelf life.

Choose Bis-Tris gel chemistry when you have a low abundance of protein or when your downstream applications require high protein integrity, such as posttranslational modification analysis, mass spectrometry, or sequencing. Bis-Tris gel chemistry provides greater sensitivity for protein detection compared to Tris-glycine gel chemistry. The innovative Bis-Tris chemistry offered in Invitrogen™ Bolt™ and NuPAGE™ gels is a modification of the conventional Laemmli Tris-Glycine system. Bis-Tris chemistry provides a neutral (pH 7.0) environment during electrophoresis, which may result in better sample integrity and stability of the gel. This helps reduce protein modifications and helps produce sharp band resolution and better-looking western blots. Invitrogen™ Bolt™ Bis-Tris Plus mini gels build on the legacy of the highly published Invitrogen™ NuPAGE™ Bis-Tris gels and can be run in as few as 20 minutes.

To separate high-abundance proteins, select our robust Invitrogen™ Novex™ Tris-Glycine gel chemistry, which offers maximum protein separation performance and crisp, straight bands.

Tris-acetate gel chemistry, offered in Invitrogen™ NuPAGE™ Tris-Acetate gels, is recommended for the separation of high molecular weight proteins up to 500 kDa.

Tricine gel chemistry is designed for the separation of low molecular weight proteins and peptides. Invitrogen™ Novex™ Tricine gels provide increased resolution of proteins with molecular weights as low as 2.5 kDa.

For separation of proteins under nondenaturing conditions, Invitrogen™ NativePAGE™ gels, also based on Bis-Tris chemistry, are designed to separate proteins up to 10,000 kDa.

Acrylamide concentration options

A wide range of gel concentrations is offered to enable the separation of a broad range of proteins. The size of the molecule being separated should determine the gel concentration selected. As a general rule, molecules should migrate through about 70% of the length of the gel for the best resolution. Use a lower-percentage gel to resolve larger molecules and a higher-percentage gel to resolve smaller proteins and peptides. Gradient gels separate a broader range of proteins than a gel with a constant percentage. As gradient gels are more difficult to hand cast, the convenience and reproducibility of Invitrogen™ gradient gels may reduce your lab's protein separation anxiety.

Refer to pages 16 and 17 of this brochure to view gel migration charts for ladders of various size ranges.

Mini gels and midi gels

Invitrogen™ precast gels are available in two size formats: mini gels and midi gels. Both gels are the same height and have similar running times, but midi gels are a wider gel format (8 cm x 13 cm), designed for your higher-throughput electrophoresis needs. The additional wells in the midi gels permit more samples or large sample volumes to be loaded onto one gel.

Gel selection guide

Find the right gel for your research needs based on sample type, separation type, and molecular weight.

Denaturing separation*			
Molecular weight range	Sample type		
	Low-abundance proteins and posttranslationally modified proteins		High-abundance proteins
Broad range molecular weight proteins (6–400 kDa)	Bis-Tris gel chemistry		Tris-glycine gel chemistry
	Bolt Bis-Tris Plus mini gels (load up to 60 µL samples)	NuPAGE Bis-Tris gels	Novex Tris-Glycine mini gels, WedgeWell format
High molecular weight proteins (40–500 kDa)	Tris-acetate gel chemistry		
	NuPAGE Tris-Acetate gels		
Low molecular weight proteins (2.5–40 kDa)	Tricine gel chemistry		
	Novex Tricine mini gels		

* Low-throughput applications. For medium- or high-throughput, see Invitrogen™ E-PAGE™ 48-well or 96-well gels at [thermofisher.com/specialtygels](https://www.thermofisher.com/specialtygels).

Native separation					
	Molecular weight			Isoelectric point	
1st dimension	NativePAGE gels	Novex Tris-Glycine mini gels, WedgeWell format	NuPAGE Tris-Acetate gels	Novex IEF gels	ZOOM IPG strips
2nd dimension	NuPAGE Bis-Tris gels, 2D well	Novex Tris-Glycine gels, 2D well	Novex Tris-Glycine gels, 2D well	Novex Tris-Glycine gels, 2D well or NuPAGE Bis-Tris gels, 2D well	Novex Tris-Glycine ZOOM gels, IPG well or NuPAGE Bis-Tris ZOOM gels, IPG well

Protease activity
Novex Zymogram gels (casein, blue casein, or gelatin substrates)

Learn more at [thermofisher.com/specialtygels](https://www.thermofisher.com/specialtygels)

 Find the right protein gel using our interactive gel selection tool at [thermofisher.com/proteingelguide](https://www.thermofisher.com/proteingelguide)

Broad molecular weight protein separation

Bis-Tris chemistry: optimized protein separation for high-sensitivity applications

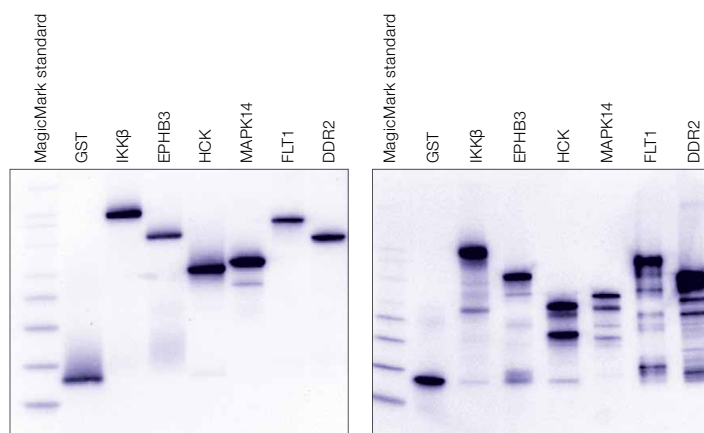
The Bis-Tris gel chemistry provides a neutral-pH environment that minimizes protein degradation. Additionally, preserving protein integrity becomes particularly important when separating low-abundance proteins. Bis-Tris chemistry gels are offered as Bolt Bis-Tris Plus mini gels and NuPAGE Bis-Tris mini gels. Bolt Bis-Tris Plus mini gels are designed for optimal separation of a broad molecular weight range of proteins under denaturing conditions during gel electrophoresis. The unique Invitrogen™ WedgeWell™ design allows loading of up to 2x more sample volume than other precast gels. Bolt gels are ideal for western blot analysis and applications where protein integrity is crucial and higher sensitivity is required.



Wedge-shaped well design of Bolt Bis-Tris Plus mini gels.

Benefits you can expect from Bolt Bis-Tris Plus gels include:

- **Preserved protein integrity**—neutral-pH formulation minimizes protein modifications or degradation that can result in poor band resolution
- **High sample-volume capacity**—WedgeWell design allows detection of proteins in very dilute samples or visualization of low-abundance proteins
- **Superior band quality and band volume**—Bolt Bis-Tris Plus gel chemistry is designed to deliver sharp, straight bands with higher band volume
- **Better protein resolution**—two buffer options enable you to selectively resolve the lower or higher molecular weight portion of the range
- **High lot-to-lot consistency**—coefficient of variation (CV) of only 2% for R_f values (migration)
- **Optimized run conditions**—separate your proteins using constant voltage in as few as 20 minutes

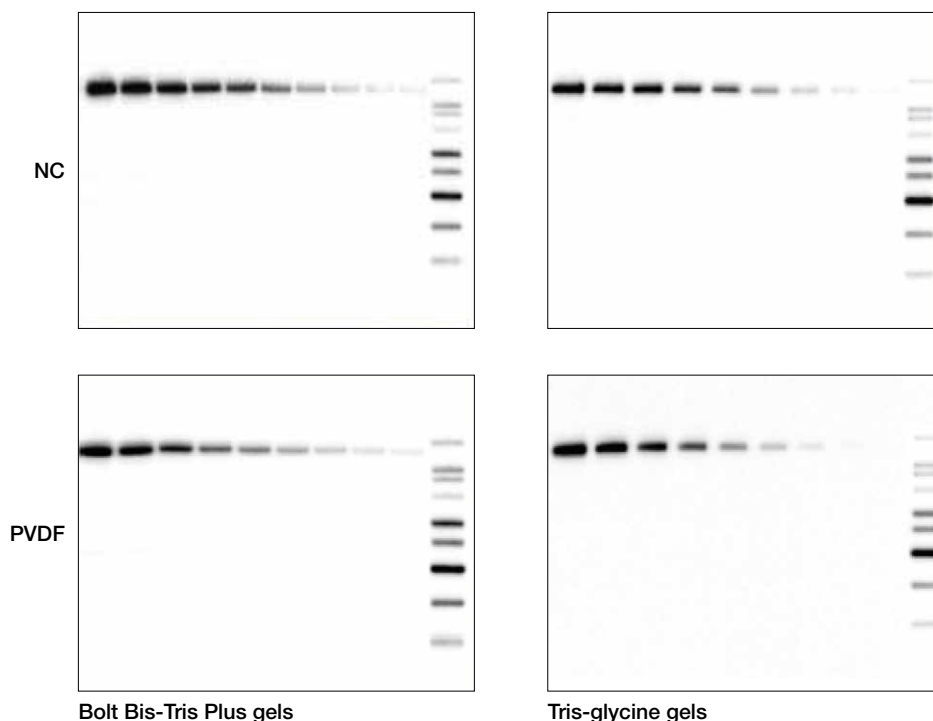


Bolt Bis-Tris Plus gel

Bio-Rad TGX gel

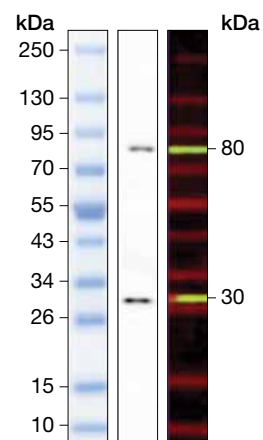
Bolt Bis-Tris Plus mini gels help provide better western blotting results. A western blot of a Bolt Bis-Tris Plus gel shows clean, sharp protein signals corresponding to only full-length proteins, whereas a western blot of a Bio-Rad™ TGX™ gel shows multiple low molecular weight degradation products. Protein kinases implicated in cancer (IKK β , EPHB3, HCK, MAPK14, FLT1, and DDR2) were analyzed on a Bolt Bis-Tris Plus gel and a Bio-Rad TGX Tris-Glycine gel. The purified kinases (50 ng each), along with Invitrogen™ MagicMark™ XP Western Protein Standard and purified recombinant GST protein, were loaded on a 10-well, 4–12% Bolt gel and a 10-well, 4–20% Bio-Rad TGX gel. The samples were separated and transferred to 0.45 μ m PVDF membranes using the respective manufacturers' protocols. Immunodetection was performed using an anti-GST antibody and Invitrogen™ WesternBreeze™ chemiluminescence detection. The blots were imaged using a western blot imaging system.

Learn more at [thermofisher.com/bolt](https://www.thermofisher.com/bolt)



Greater sensitivity with Bolt Bis-Tris Plus gels. Total cell extracts from A431 cells were transferred to NC and PVDF membranes from a 4–12% Bolt Bis-Tris Plus gel, and 4–20% Tris-Glycine precast gel using the Invitrogen™ iBlot™ 2 Gel Transfer Device. The cells were treated with 100 ng/mL of human epidermal growth factor (hEGF) to up-regulate expression of the phospho-EGF receptor. The protein loads of the cell extracts ranged from 20 µg to 1.2 µg of extract. The blots were processed on the Invitrogen™ iBind™ Western System with a 1:200 dilution of Phospho-EGF Receptor (Tyr1068) mouse monoclonal antibody and a 1:2,000 dilution of anti-mouse HRP secondary antibody. Detection was performed with Invitrogen™ Novex™ ECL HRP Substrate. Detection sensitivity was nearly two-fold greater using blots from Bolt gels compared to blots from Tris-glycine gels.

Specifications	
Gel percentages	8%, 10%, 12%, 4–12%
Gel dimensions	Mini (8 x 8 cm), 1.0 mm thick
Shelf life	16 months at 4–25°C
Separation range	15 kDa to 260 kDa (MOPS buffer), 3.5 kDa to 160 kDa (MES buffer)
Run time	20 min (MES buffer) 35 min (MOPS buffer)
Running buffer	NuPAGE MES SDS Running Buffer or NuPAGE MOPS SDS Running Buffer
Sample buffer	4X Bolt LDS Sample Buffer with 10X Bolt Sample Reducing Agent
Recommended ladders	iBright Prestained Protein Ladder



Invitrogen™ iBright™ Prestained Protein Ladder. Gel: Invitrogen™ Novex™ 4–20% Tris-Glycine mini gel, WedgeWell format; left: prestained ladder after gel separation; center: chemiluminescent substrate on western blot; right: near-IR fluorescence on western blot.

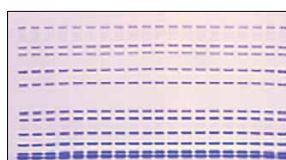
Bis-Tris gels cited in more than 20,000 publications

Bis-Tris gel chemistry maintains proteins in a neutral-pH environment that preserves protein integrity, resulting in sharp, straight bands. NuPAGE Bis-Tris gels provide the benefits of Bis-Tris chemistry and have been proven reliable in more than 20,000 publications. Tried, trusted, and true, NuPAGE Bis-Tris gels give you superior broad-range protein resolution and are offered in mini and midi formats.

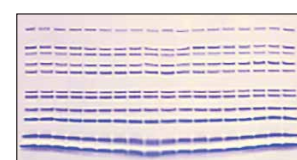


Benefits you can expect from NuPAGE Bis-Tris gels include:

- **Preserved protein integrity**—neutral-pH formulation minimizes protein modifications or degradation
- **High lot-to-lot consistency**—coefficient of variation (CV) of only 2% for R_f values (migration)
- **A long shelf life**—16 months at room temperature



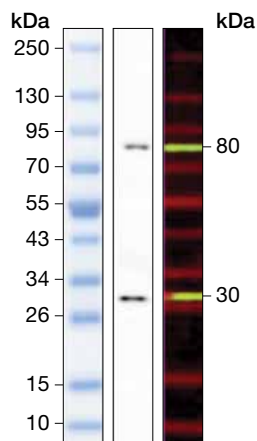
NuPAGE 4–12% Bis-Tris midi gel



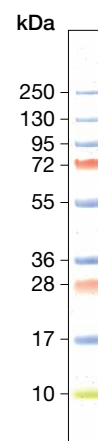
Bio-Rad 4–12% Criterion XT Bis-Tris gel

NuPAGE Bis-Tris gels deliver straighter lanes and straighter bands. A NuPAGE 4–12% Bis-Tris midi gel with MOPS buffer and a Bio-Rad™ 4–12% Criterion™ XT Bis-Tris gel with MOPS buffer were loaded with 5 μ L Invitrogen™ Mark12™ Unstained Standard in each lane and stained with Coomassie dye. Go to thermofisher.com to view data showing that NuPAGE gels can resolve greater cell lysate loads than Bio-Rad gels.

Specifications	
Gel percentages	10%, 12%, 4–12%, and 8% (midi only)
Gel dimensions	Mini (8 x 8 cm), 1.0 mm and 1.5 mm thick; midi (8 x 13 cm), 1.0 mm thick
Shelf life	16 months at 4–25°C
Separation range	15 kDa to 260 kDa (MOPS buffer), 3.5 kDa to 160 kDa (MES buffer)
Run time	As little as 35 minutes
Running buffer	NuPAGE MES SDS Running Buffer for small proteins or NuPAGE MOPS SDS Running Buffer for medium-to-large proteins; use NuPAGE Antioxidant in the running buffer to maintain reduced state during the run
Sample buffer	NuPAGE LDS Sample Buffer with NuPAGE Sample Reducing Agent
Recommended ladders	iBright Prestained Protein Ladder (western blotting applications), PageRuler Plus Prestained Protein Ladder (for in-gel staining)



iBright Prestained Protein Ladder. Gel: Novex 4–20% Tris-Glycine mini gel, WedgeWell format; left: prestained ladder after gel separation; center: chemiluminescent substrate on western blot; right: near-IR fluorescence on western blot.



Thermo Scientific™ PageRuler™ Plus Prestained Protein Ladder. NuPAGE 4–12% Bis-Tris gel run with Invitrogen™ NuPAGE™ MES SDS Running Buffer.

Tris-glycine chemistry: sharp protein resolution

Tris-glycine gels are robust for a wide range of sample types. Based on the traditional Laemmli chemistry, Novex Tris-Glycine gels provide high-quality performance and separation of a wide range of proteins into well-resolved bands and are compatible with samples containing detergent and high salt.

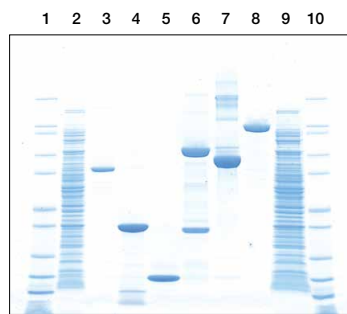
As an added bonus, Invitrogen™ Novex™ Tris-Glycine mini gels in the WedgeWell format feature easier-to-load, larger-capacity wells that let you load up to 60 µL of sample.

Highlights:

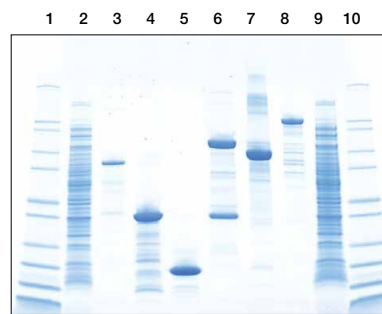
- **High performance**—excellent protein band resolution and sharpness
- **Wedge-shaped wells**—easily load up to 60 µL of sample without sacrificing gel width or length (mini format only)
- **Fast run conditions**—quickly separate your proteins using constant voltage in less than 60 minutes
- **Flexible**—Novex Tris-Glycine gels do not contain SDS and can be used to run your proteins in native or denatured form



Wedge-shaped well design of Novex Tris-Glycine mini gels, WedgeWell format.

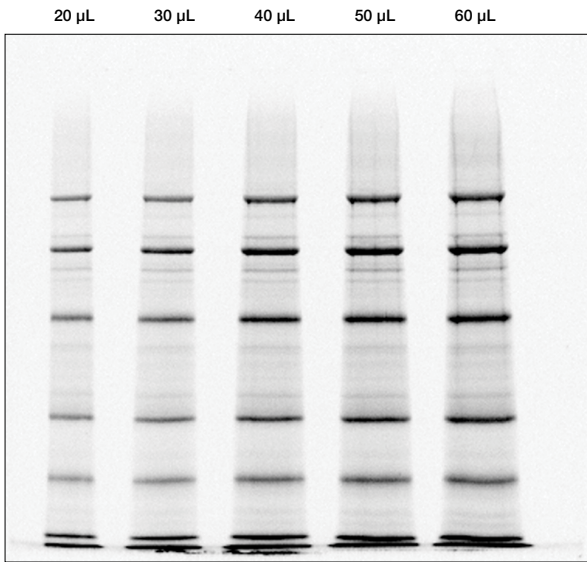


Novex 4–20% Tris-Glycine mini gel, WedgeWell format

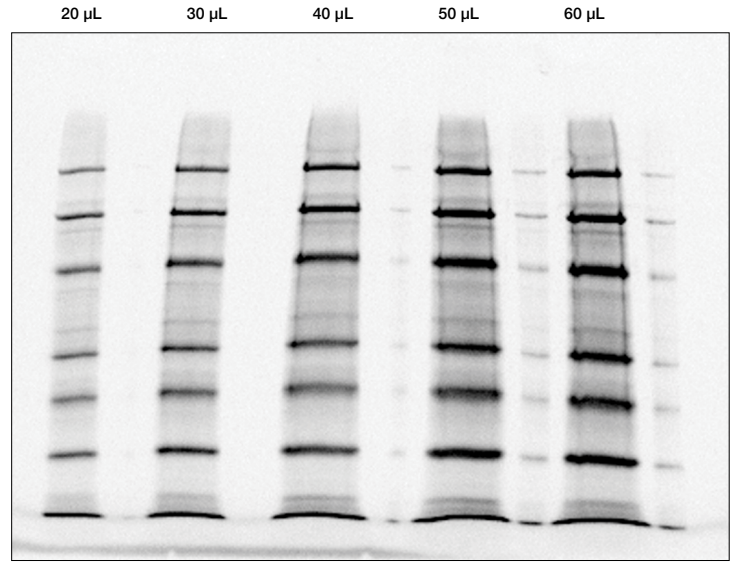


Bio-Rad TGX 4–20% Gel

Better protein resolution and band sharpness with Novex Tris-Glycine mini gels, WedgeWell format. Protein ladder, purified proteins, and *E. coli* lysate were loaded on a gradient Novex 4–20% Tris-Glycine mini gel, WedgeWell format, and a Bio-Rad TGX 4–20% gradient gel. The Bio-Rad TGX gel displays numerous low molecular weight protein degradation products below major bands in lanes 3, 4, 7, and 8. These are not seen in the Novex Tris-Glycine gel. The Novex gel also displays better protein band sharpness and resolution of lysate than the Bio-Rad gel. **Lanes 1, 10:** 5 µL Mark12 Unstained Standard; **lane 2:** 10 µg *E. coli* lysate (10 µL sample volume); **lane 3:** 6 µg catalase (10 µL sample volume); **lane 4:** 6 µg carbonic anhydrase (10 µL sample volume); **lane 5:** 6 µg lysozyme (10 µL sample volume); **lane 6:** 6 µg hlgM (10 µL sample volume); **lane 7:** 6 µg BSA (10 µL sample volume); **lane 8:** 6 µg beta-galactosidase (10 µL sample volume); **lane 9:** 20 µg *E. coli* lysate (20 µL sample volume).



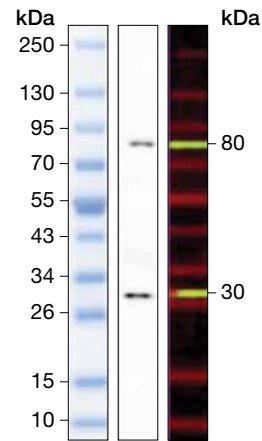
Novex Tris-Glycine mini gel, WedgeWell format, 10-well



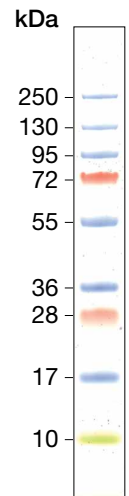
Bio-Rad TGX gel, 10-well

Increased sample volume capacity of Novex Tris-Glycine mini gels, WedgeWell format. Increasing volumes (20–60 µL) of a fluorescent protein ladder were loaded in every other lane of a Novex Tris-Glycine 10-well mini gel, WedgeWell format and a Bio-Rad TGX 10-well gel. In the Bio-Rad gel, sample spillover is observed in lanes adjacent to the 50 µL and 60 µL load lanes.

Specifications	
Gel percentages	6%, 8%, 10%, 12%, 14%, 16%, 4–12%, 4–20%, 8–16%, 10–20%
Gel dimensions	Mini (8 x 8 cm), midi (8 x 13 cm); 1.0 mm thick
Shelf life	Up to 12 months at 4°C
Separation range	8 kDa to 260 kDa
Run time	60 min
Running buffer	Novex Tris-Glycine SDS Running Buffer; for native gels, we recommend Novex Tris-Glycine Native Running Buffer
Sample buffer	Novex Tris-Glycine SDS Sample Buffer; for native gels, we recommend Novex Tris-Glycine Native Sample Buffer
Recommended ladders	iBright Prestained Protein Ladder (western blotting applications), PageRuler Plus Prestained Protein Ladder (for in-gel staining)



iBright Prestained Protein Ladder. Gel: Novex 4–20% Tris-Glycine Mini Gel, WedgeWell format; left: prestained ladder after gel separation; center: chemiluminescent substrate on western blot; right: near-IR fluorescence on western blot.



PageRuler Plus Prestained Protein Ladder. Gel: 4–20% Tris-glycine (SDS-PAGE).

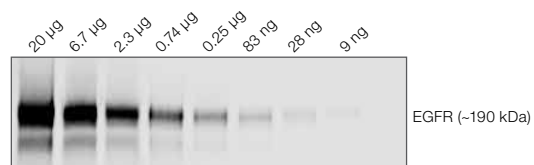
High molecular weight protein separation

Tris-acetate chemistry: designed for separation and detection of high molecular weight proteins

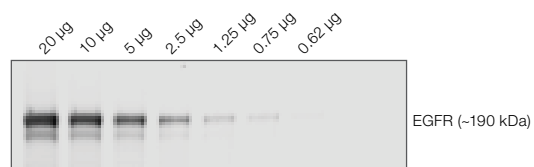
Tris-acetate gel chemistry enables the optimal separation of high molecular weight proteins when used with an SDS running buffer. Invitrogen™ NuPAGE™ Tris-Acetate gels offer a pH 8.1 environment that minimizes protein modifications and results in sharper bands. NuPAGE Tris-Acetate gels can also be run with Invitrogen™ Novex™ Tris-Glycine Native Running Buffer to resolve native proteins more effectively than a Tris-glycine gel system.

NuPAGE Tris-Acetate gels and buffers are designed to allow:

- Optimal separation of high molecular weight proteins
- Preservation of protein sample integrity using optimized sample preparation processes
- Excellent transfer of high molecular weight proteins



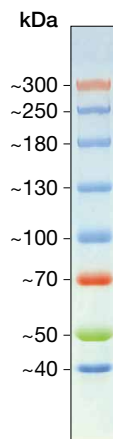
Invitrogen™ NuPAGE™ 3–8% Tris-Acetate mini gel



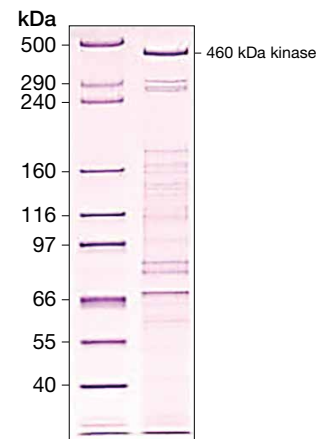
Novex 4–20% Tris-Glycine mini gel, WedgeWell format

Improved transfers of high molecular weight proteins enhance western detection sensitivity. Western blotting analysis of EGFR from A431 lysates transferred from a Novex 4–20% Tris-Glycine mini gel, WedgeWell format, and a NuPAGE 3–8% Tris-Acetate mini gel using the iBlot 2 Gel Transfer Device.

Specifications	
Gel percentages	7%, 3–8%
Gel dimensions	Mini (8 x 8 cm), 1.0 mm and 1.5 mm thick; midi (8 x 13 cm), 1.0 mm thick
Shelf life	8 months at 2–8°C
Separation range	30 kDa to 500 kDa
Run time	60 min for denaturing gel; 2–3 hours for native gel
Running buffer	For denatured proteins we recommend NuPAGE Tris-Acetate SDS Running Buffer; for native proteins we recommend Novex Tris-Glycine Native Running Buffer
Sample buffer	For denatured proteins we recommend NuPAGE LDS Sample Buffer; for native proteins we recommend Novex Tris-Glycine Native Sample Buffer
Recommended ladders	Spectra Multicolor High Range Protein Ladder (western blotting applications), HiMark Unstained Protein Standard (for in-gel staining)



Thermo Scientific™ Spectra™ Multicolor High Range Protein Ladder. Gel: 4–12% Tris-glycine gel (SDS-PAGE).



Invitrogen™ HiMark™ Unstained Protein Standard and high molecular weight proteins. Gel: NuPAGE 3–8% Tris-Acetate; stain: Thermo Scientific™ Coomassie™ R-250 dye; left lane: 5 µL of HiMark Unstained Protein Standard; right lane: 4 µL of protein kinase sample.

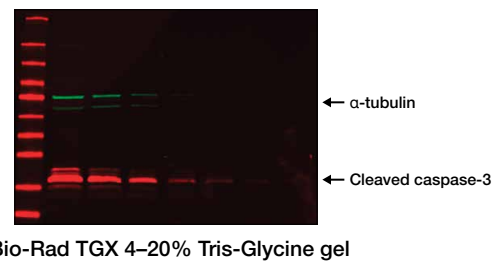
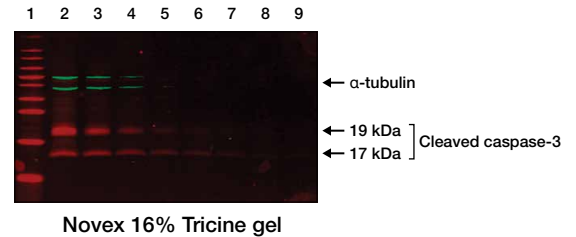
Low molecular weight protein separation

Tricine chemistry: designed for separation and detection of low molecular weight proteins

Tricine gel chemistry enables the optimum separation of low molecular weight proteins and peptides. Novex Tricine gels are high-resolution gels for peptide and low molecular weight protein analyses. The Novex Tricine gel system is a modification of the Tris-glycine system in which tricine replaces glycine in the running buffer. This system uses a discontinuous buffer system specifically designed for the resolution of low molecular weight proteins.

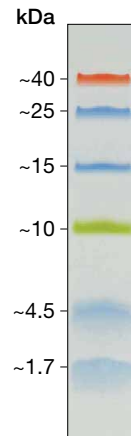
Advantages of Novex Tricine gels over Tris-glycine gels include:

- Increased resolution of proteins with molecular weights as low as 2.5 kDa
- Improved compatibility with direct protein sequencing applications after transferring to PVDF membranes
- Minimized protein modification due to the lower pH of the tricine buffering system
- Minimized protein blow-through during protein transfer

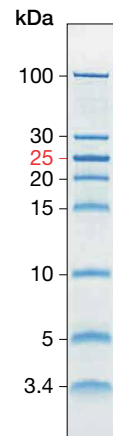


Novex Tricine gels better resolve low molecular weight proteins. Lane 1: Thermo Scientific™ PageRuler™ Prestained NIR Protein Ladder; lanes 2-9: 1 μL loads per well of a 1.5x dilution series of a Jurkat cell lysate after cytochrome C treatment. After separation on Invitrogen™ Novex™ 16% Tricine and Bio-Rad TGX 4-20% Tris-Glycine gels, transfers were probed with primary antibodies against caspase-3 and α-tubulin, followed by secondary antibodies labeled with Invitrogen™ Alexa Fluor™ Plus 680 and Alexa Fluor™ Plus 800 dyes, respectively. The Novex 16% Tricine gel resolved the 17 and 19 kDa bands of cleaved caspase-3, whereas the Bio-Rad TGX Tris-Glycine gel did not provide such resolution.

Specifications	
Gel percentages	10%, 16%, 10-20%
Gel dimensions	Mini (8 x 8 cm), 1.0 mm thick
Shelf life	1-2 months at 2-8°C
Separation range	2 kDa to 20 kDa
Run time	90 min
Running buffer	Novex Tricine SDS Running Buffer
Sample buffer	Novex Tricine SDS Sample Buffer
Recommended ladders	Spectra Multicolor Low Range Protein Ladder (western blotting applications), PageRuler Unstained Low Range Protein Ladder (for in-gel staining)



Spectra Multicolor Low Range Protein Ladder. Gel: Tricine.



Thermo Scientific™ PageRuler™ Unstained Low Range Protein Ladder. Gel: Tricine; stain: Coomassie blue.

Native protein gel electrophoresis

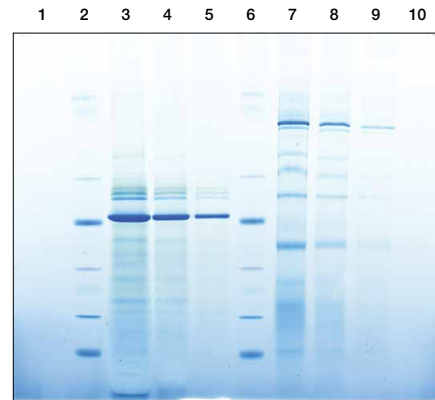
Bis-Tris chemistry: superior resolution of native proteins and protein complexes

Bis-Tris chemistry offers sensitive, high-resolution analysis of native proteins and protein complexes for molecular mass estimations and assessment of purity. NativePAGE Bis-Tris gels are based on the blue native polyacrylamide gel electrophoresis (BN-PAGE) technique that overcomes the limitations of traditional native electrophoresis by providing a near-neutral operating pH and detergent compatibility.

We offer NativePAGE Bis-Tris gels for blue native electrophoresis of proteins and protein complexes.

Advantages of the NativePAGE Bis-Tris gel system over traditional Tris-glycine gels include:

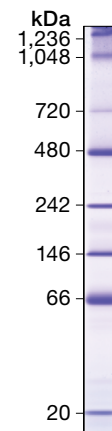
- **Wide molecular weight resolving range**—from 15 kDa to 10,000 kDa
- **Neutral-pH separation**—better preserves the native state of protein complexes
- **BN-PAGE technique**—resolution of all proteins in the gel regardless of their isoelectric point (pI)
- **High performance**—higher resolution than with Tris-glycine native electrophoresis



Invitrogen™ NativePAGE™
3–12% Bis-Tris Mini Protein Gels

NativePAGE Bis-Tris mini gel electrophoresis resolves very large proteins and protein complexes. Two-fold dilution series of protein extracts were run on an Invitrogen™ NativePAGE™ 3–12% Bis-Tris mini gel using an Invitrogen™ Mini Gel Tank. Lanes 1 and 10: blank; lanes 2 and 6: 5 µL Invitrogen™ NativeMark™ Unstained Protein Standard; lanes 3, 4, and 5: 10, 5, and 2.5 µg spinach chloroplast extract; lanes 7, 8, and 9: 10, 5, and 2.5 µg bovine mitochondrial extract.

Specifications	
Gel percentages	3–12%, 4–16%
Gel dimensions	Mini (8 x 8 cm), 1.0 mm thick
Shelf life	1–2 months at 2–8°C
Separation range	15 kDa to 10,000 kDa
Run time	90 min
Running buffer	NativePAGE Running Buffer and NativePAGE Cathode Buffer Additive
Sample buffer	NativePAGE Sample Buffer
Recommended ladders	NativeMark Unstained Protein Standard



NativeMark Unstained Protein Standard.
Gel: 4–16% NativePAGE Bis-Tris gel;
stain: Coomassie G-250.

Gel tanks and protein stains

Mini Gel and SureLock Tandem Midi Gel Tanks

The Invitrogen™ Mini Gel Tank is designed for more intuitive use and greater convenience compared to traditional electrophoresis tanks. The unique, side-by-side tank design allows you to perform electrophoresis of 1 or 2 Invitrogen™ mini gels. The Invitrogen™ SureLock™ Tandem Midi Gel Tank is designed for higher-throughput electrophoresis of Invitrogen™ midi gels.

The Mini Gel Tank offers:

- **Versatility**—compatible with all of our mini gels, including Bolt, NuPAGE, Novex, and NativePAGE gels
- **Easy sample loading**—forward-facing well configuration

The SureLock Tandem Midi Gel Tank offers:

- **Higher-throughput**—run up to 52 samples per gel tank

Both tanks offer:

- **Less running buffer required**—gel chambers are separated, so you only need to load sufficient buffer for each gel to the specified fill line
- **Convenient, room-temperature western blotting**—innovative blot modules fit into the tank chambers for easy protein transfer



Gel stains

A wide variety of gel staining options are available for your applications, including Coomassie, silver, and fluorescent staining.

Coomassie staining

Invitrogen™ SimplyBlue™ SafeStain is a ready-to-use, fast, sensitive, and safe Coomassie G-250 stain for visualizing protein bands on polyacrylamide gels. SimplyBlue SafeStain is completely nonhazardous and does not require methanol or acetic acid fixatives or destains.

Silver staining

The Thermo Scientific™ Pierce™ Silver Stain Kit is a rapid, ultrasensitive, and versatile silver stain system for protein detection in polyacrylamide gels. The Pierce Silver Stain Kit is a metallic silver (Ag) protein stain that yields a remarkably clear and uniform gel background while enabling consistent, high-sensitivity staining results.



Learn more at [thermofisher.com/electrophoresischambers](https://www.thermofisher.com/electrophoresischambers)

Learn more at [thermofisher.com/proteinstains](https://www.thermofisher.com/proteinstains)

Protein ladders

A complete line of protein ladders to assist your protein analysis

Our broad range of prestained and unstained protein ladders are supplied in a ready-to-use format to facilitate easy protein analysis during gel electrophoresis and western blotting.

Prestained protein ladders are recommended for:

- Approximate determination of molecular weight
- Monitoring the progress of electrophoresis runs
- Estimating the efficiency of protein transfer to the membrane during western blotting

Unstained protein ladders are recommended for:

- Precise determination of target protein molecular weights in any buffer system

Our protein ladders offer extraordinary value—high quality without the high price:

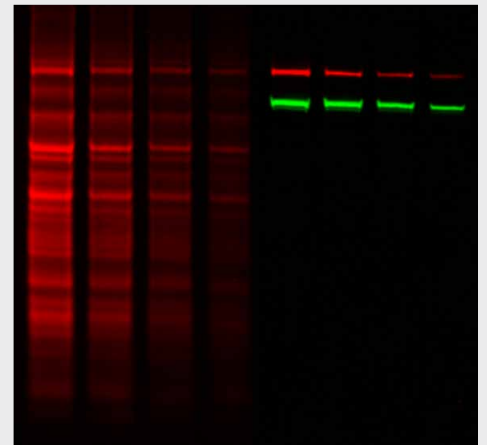
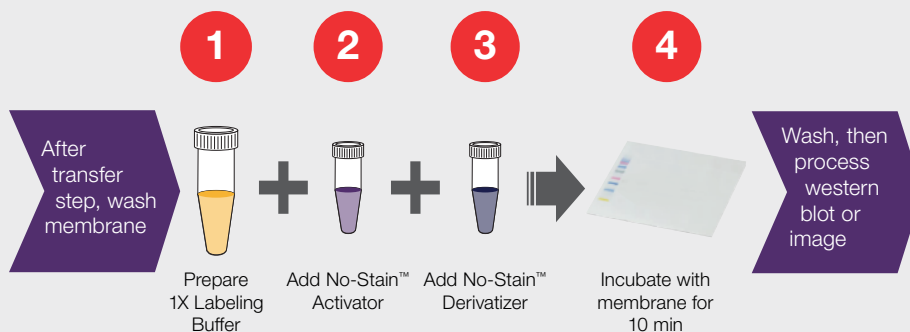
- **Performance**—sharp protein bands and consistent migration patterns enable easy molecular weight determination
- **Convenience**—protein ladders are ready to load, with no heating required
- **Reliability**—exceptional lot-to-lot consistency and reproducibility

Find out more at

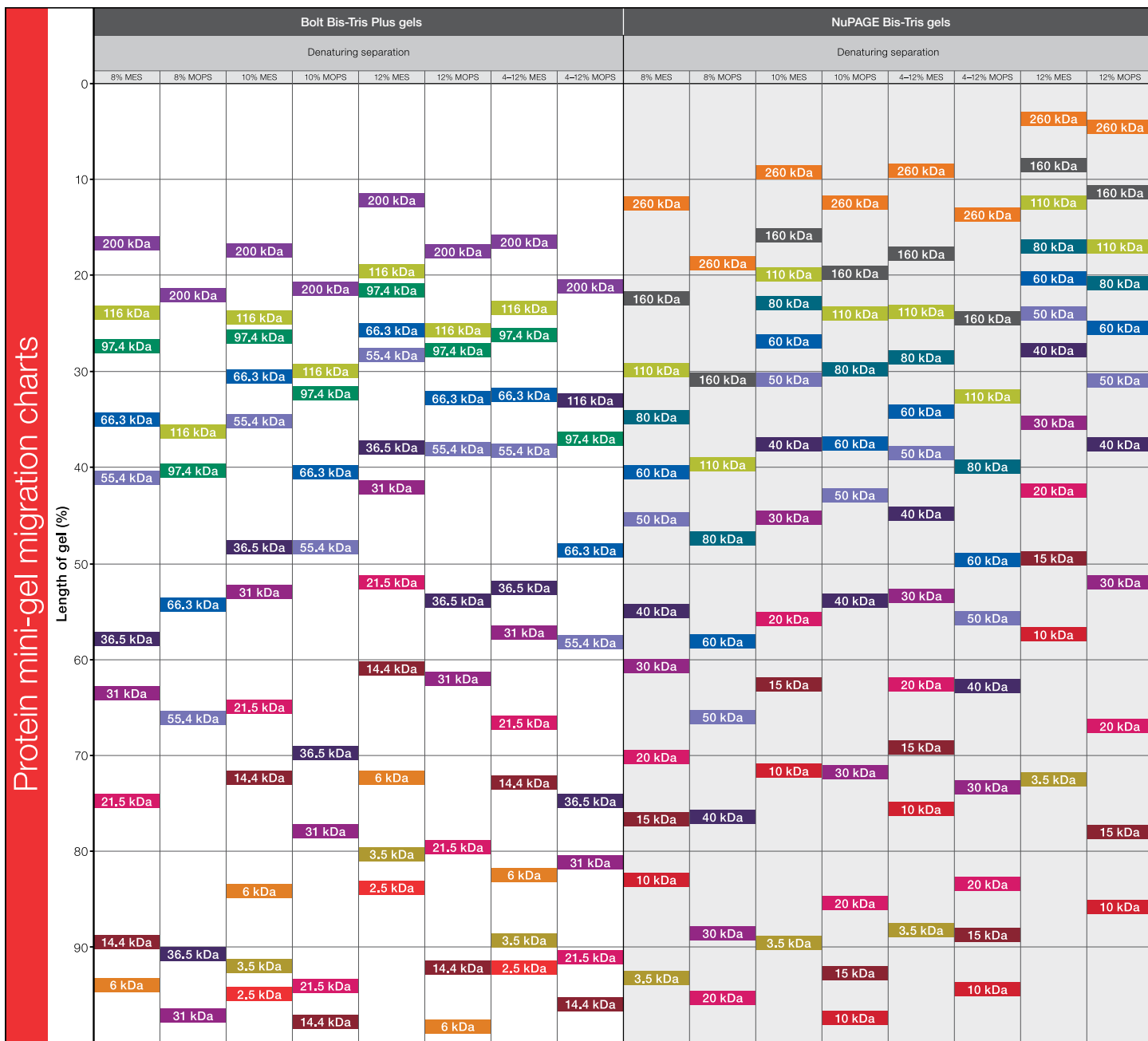
thermofisher.com/proteinladders

Total protein normalization of western blots

Total protein normalization is a useful method for obtaining accurate, quantitative western blotting data, as housekeeping proteins can often be affected by experimental conditions. The Invitrogen™ No-Stain™ Protein Labeling Reagent is a fast, easy-to-use, covalent protein labeling reagent. When applied to a membrane after gel transfer, it provides sensitive, linear detection of protein for total protein normalization of western blotting data. The No-Stain Protein Labeling Reagent can also be used as a fast, sensitive gel stain.



Learn more at thermofisher.com/no-stain



These charts map the migration patterns of proteins of various sizes in our mini gels. Use them to help you select the best gel to separate your protein of interest.

Novex Tris-Glycine gels, WedgeWell format					NuPAGE Tris-Acetate gels		Novex Tricine gels			NuPAGE Tris-Acetate gels		NativePAGE gels	
Denaturing separation					Denaturing separation		Blotting and sequencing	Synthetic peptides and tryptic analysis	Wide range	Native separation		Native separation	
10%	12%	4-12%	8-16%	4-20%	3-8%	7%	10%	16%	10-20%	3-8%	7%	3-12%	4-16%
													1,048 kDa
						500 kDa		200 kDa			1,048 kDa		
						290 kDa		116 kDa					
					500 kDa	240 kDa	200 kDa	97 kDa			1,048 kDa	1,236 kDa	
	200 kDa							66 kDa					
200 kDa								55 kDa	200 kDa			1,048 kDa	720 kDa
				200 kDa		160 kDa	116 kDa						
					290 kDa		97 kDa	36 kDa	116 kDa		720 kDa		
	116 kDa				240 kDa								
116 kDa	97 kDa					116 kDa		31 kDa	66 kDa				480 kDa
97 kDa		200 kDa		97 kDa		97 kDa	66 kDa						
							55 kDa	21 kDa	55 kDa			720 kDa	
	66 kDa		116 kDa	66 kDa	160 kDa						480 kDa		
66 kDa	55 kDa		97 kDa					14 kDa			720 kDa		242 kDa
				55 kDa						36 kDa			
			116 kDa	66 kDa	116 kDa	66 kDa				31 kDa		480 kDa	
55 kDa		97 kDa			97 kDa		36 kDa						146 kDa
		55 kDa	36 kDa				31 kDa	6 kDa	21 kDa				
	36 kDa					55 kDa				14 kDa			
		66 kDa		31 kDa	66 kDa							242 kDa	66 kDa
								3.5 kDa			480 kDa		
	31 kDa		36 kDa				21 kDa	2.5 kDa					
36 kDa		55 kDa										146 kDa	
			31 kDa	21 kDa	55 kDa	40 kDa			6 kDa		242 kDa		
							14 kDa						
		36 kDa	21 kDa	14 kDa						3.5 kDa			66 kDa
31 kDa	21 kDa									2.5 kDa			
		31 kDa	14 kDa	6 kDa									
											242 kDa		20 kDa
	14 kDa	21 kDa						6 kDa				146 kDa	

Protein gels welcome packs

Protein gels welcome packs contain the components for outstanding protein separation and are available for our mini and midi protein gels. The typical protein gels welcome pack provides all of the necessary gels, buffers, and reagents you need, as well as the Mini Gel or SureLock Tandem Midi Gel Tank. Protein gels welcome packs are also available in mini gel and midi gel formats designed for use in protein expression experiments and subsequent purification steps.

Learn more at thermofisher.com/proteingelwelcome



PowerEase Touch power supplies

The Invitrogen™ PowerEase™ Touch power supplies make setting up custom protocols or selecting one of the several preprogrammed gel electrophoresis and transfer methods a breeze with an improved 4.3-inch backlit LCD touchscreen



display and user interface. The power supplies are ideal for DNA or RNA electrophoresis, SDS-PAGE, and NativePAGE gels. The PowerEase Touch power supplies offer four sets of output jacks that can be used simultaneously with three modes: constant voltage, constant current, and constant power. The sturdy polyurethane feet and stackable housing design allow stacking of power supplies for a reduced footprint on the lab bench. The PowerEase Touch power supplies offer:

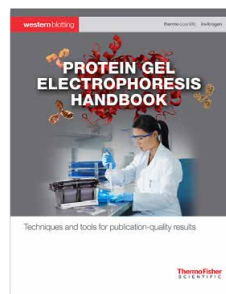
- **Ease of use**—LCD touchscreen display and user interface show clear menu prompts for easy use by hand or stylus and convenient monitoring of run progress
- **Convenience**—four sets of output terminals allow running of multiple electrophoresis units
- **Customization**—program up to 100 custom methods, 20 steps per method, and 999 minutes per step, or select one of several preprogrammed Invitrogen™ gel electrophoresis and transfer methods
- **Safety**—features automatic no-load, over-temperature, over-voltage, over-current, load-change, and ground-leak detection

thermofisher.com/powersupplies

Model	Wattage maximum	Voltage maximum	Amperage maximum	Mini gel runs	Mini gel transfers	Midi gel runs	Midi gel transfers	IEF gels
PowerEase Touch 120W Power Supply	120 W	300 V	500 mA	4	2	2	No	No
PowerEase Touch 350W Power Supply	350 W	300 V	3,000 mA (3A)	12	8	8	4	No
PowerEase Touch 600W Power Supply	600 W	500 V	3,000 mA (3A)	16	8	14	4	Yes



Learn about our protein gel performance guarantee at thermofisher.com/proteingelguarantee



thermofisher.com/westernhandbook

Learn more at thermofisher.com/proteingels