



## Criterion Stain Free™ Gel Imaging System

Fast, easy, and green SDS-PAGE analysis  
with highly reproducible results.

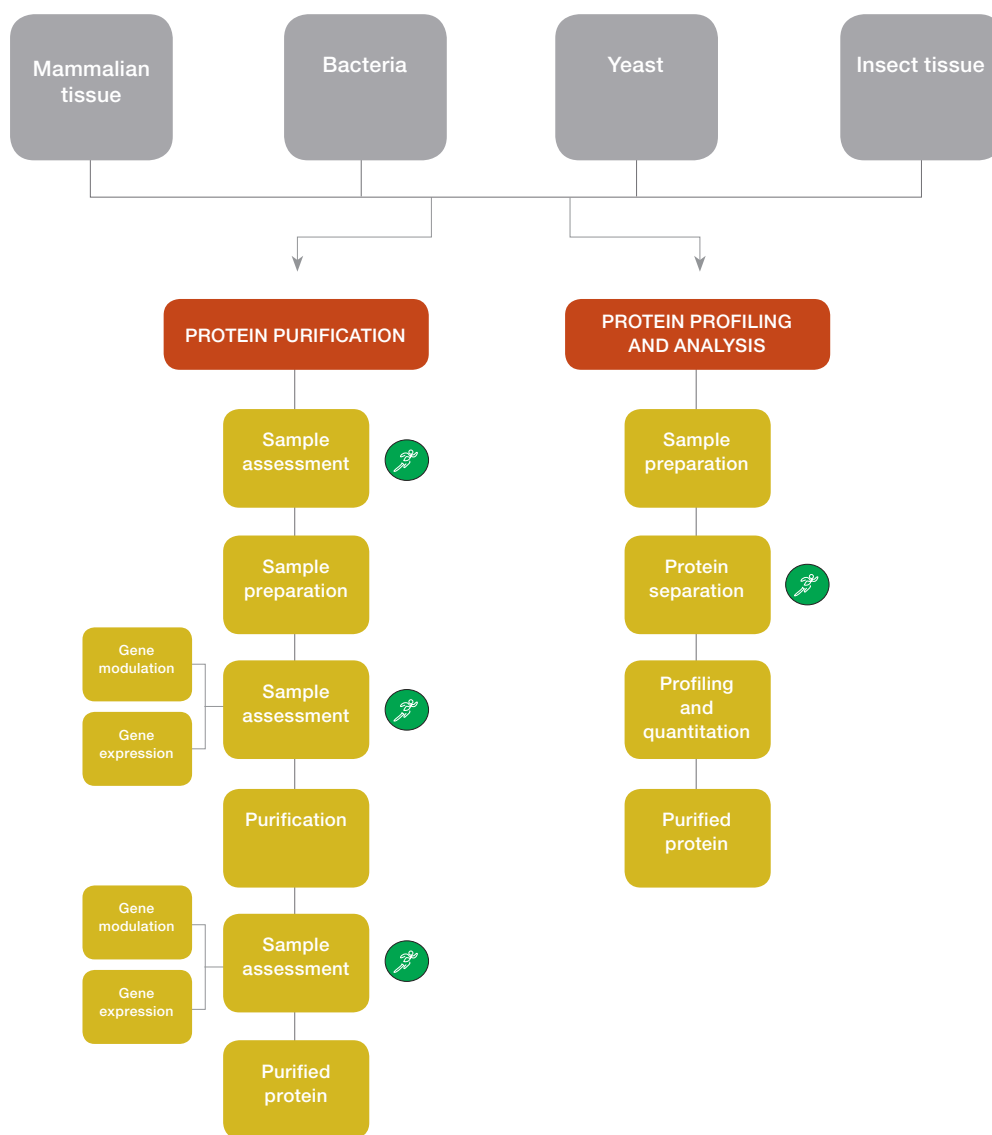


fast | reproducible | green



# Criterion Stain Free Gel Imaging System

Get to protein  
analysis faster.  
Remove  
bottlenecks.



Examples of steps where sample evaluation can be performed using the Criterion Stain Free system.







SDS-PAGE followed by Coomassie staining is a standard, widely used method to visualize proteins. However, it involves time-consuming staining and destaining procedures.

You can save considerable time and reach your purification goals faster with the Criterion Stain Free gel imaging system. The system enables you to bypass the staining and destaining steps and to visualize your protein samples in as little as 2.5 minutes after electrophoresis. In addition, the system captures digital images of your gels to make record keeping easy and gel drying obsolete. The Criterion Stain Free gel imaging system allows you to finish projects quickly and efficiently.

The Criterion Stain Free system consists of a new formulation of Criterion™ precast gels, a Criterion Stain Free imager, and Image Lab software.

#### Key Benefits of the System:

- Gel images and complete analysis in as little as 2.5 minutes after electrophoresis
- One-touch instrument operation
- Equal or better sensitivity to that of Coomassie stain
- Compatible with western blotting, mass spectrometry, and standard staining methods
- Digital images and data are easy to share, print, and store
- No gel drying step
- No organic waste disposal concerns

## Fast, Reproducible, Green

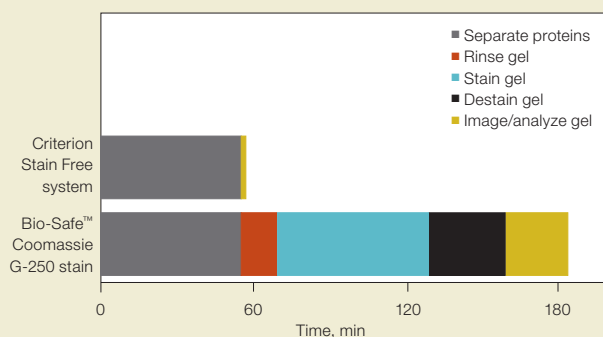
Fast, reproducible results and a green workflow are innovative features of the Criterion Stain Free system. Sensitivity of the Criterion Stain Free method is similar to that of Coomassie staining, but results are achieved faster and more consistently.

## Fast Protocol

Following is a time comparison of colloidal Coomassie and Criterion Stain Free system staining protocols after electrophoresis.

Steps	Colloidal Coomassie Stain	Criterion Stain Free
Washes in deionized water	15 min (3 x 5 min)	0 min
Staining time	60 min (30–60 min)	0 min
Destaining time	30 min	0 min
Imaging and analysis	15–30 min	2.5–5 min
<b>Total time</b>	<b>~135 min</b>	<b>&lt;5 min</b>

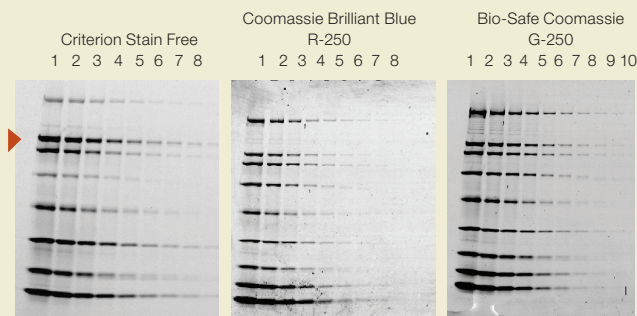
The Criterion Stain Free system protocol can save up to 2 hours over a Coomassie staining protocol — and that doesn't include the extra 24–48 hours required to dry Coomassie-stained gels for laboratory record keeping. The automated imaging and analysis provided by the Criterion Stain Free system enables printed reports that contain the gel image, molecular weight, and purity analysis. Biopharmaceutical researchers involved in the design process identified time management benefits, faster time to results, and elimination of the gel drying procedure as key advantages of the Criterion Stain Free system.



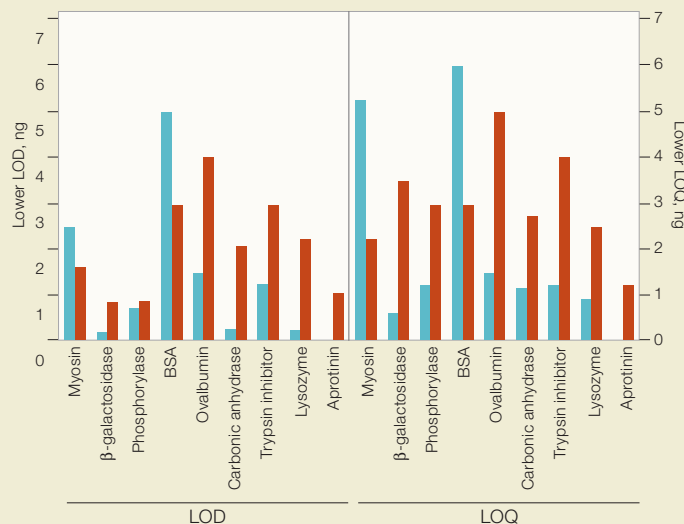
**Comparison of Criterion Stain Free system and Bio-Safe Coomassie staining workflows.** The electrophoresis run time for both Criterion Stain Free system and Coomassie-stained gels is the same at 55 min. After electrophoresis, Criterion Stain Free gels take 2.5–5 min to generate results, while Coomassie staining takes at least 2 hr to generate the same level of sensitivity (the graph does not include times for changing solutions).

## Sensitivity Comparison

The sensitivity of the Criterion Stain Free system is equal to or better than that of Coomassie stain. A comparison done with a serial dilution of broad-range standards and cell lysates showed no loss in sensitivity, indicating that the Criterion Stain Free method is compatible with both simple and complex samples.



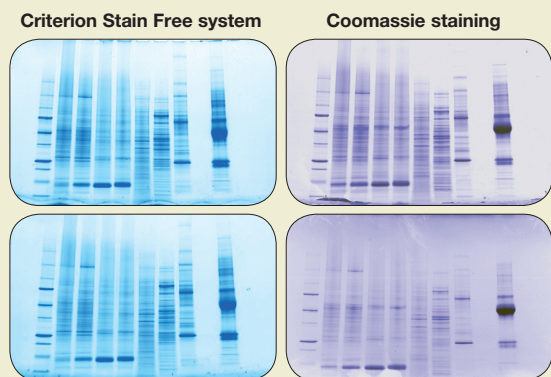
**Comparison of a Criterion Stain Free gel image and Coomassie-stained gel images.** Serial 1:2 dilutions of broad range unstained molecular weight standards were separated on 4–20% Criterion Stain Free Tris-HCl gels. The gels were imaged with the Criterion Stain Free system, then stained with Coomassie stain and imaged on a Molecular Imager® GS-800™ calibrated densitometer. Arrowhead indicates  $\beta$ -galactosidase.



**Limits of detection (LOD) and limits of quantitation (LOQ) of proteins on Criterion Stain Free and Bio-Safe G-250-stained gels.** Individual protein bands from broad range unstained standards from four replicate gels were used to determine visual LOD and LOQ. Averaged numbers were used to generate the graph.

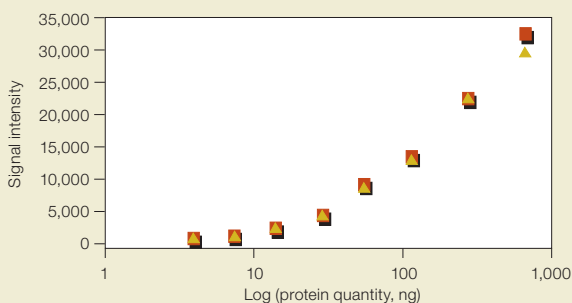
## Reproducible Results

Different staining and destaining times with Coomassie stain can result in varying gel backgrounds and results. The Criterion Stain Free system standardizes SDS-PAGE results for easy data comparison. Image and data analyses are automated and uniform, enabling standardization of methods and analysis.

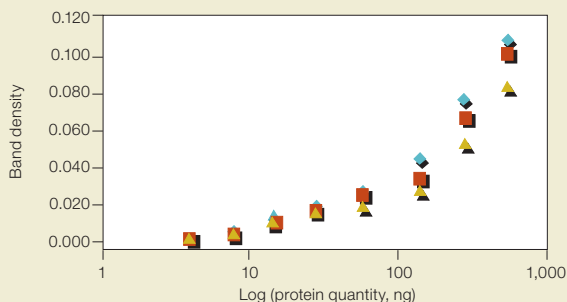


**Criterion Stain Free system vs. Coomassie staining.** Duplicate serial dilutions of molecular weight standards were visualized using the Criterion Stain Free system and Coomassie staining. The Criterion Stain Free system SDS-PAGE analysis provides reproducible results in less than 5 min. Coomassie staining produces variable background despite use of consistent staining and destaining times.

### A. $\beta$ -galactosidase band, Criterion Stain Free system



### B. $\beta$ -galactosidase band, Coomassie Brilliant Blue R-250 stain

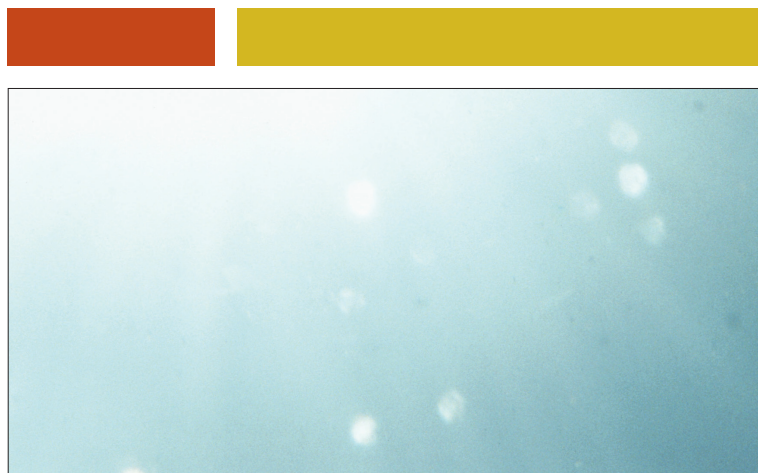


**Reproducibility of protein quantitation in Criterion Stain Free gels (A) and Coomassie Brilliant Blue R-250-stained gels (B).** Quantitation of the  $\beta$ -galactosidase bands of the broad range standards was performed for different dilutions in three replicate gels. Higher reproducibility is observed with the Criterion Stain Free system compared with Coomassie staining. Average %CV for Criterion Stain Free gels is 4.85%; for Coomassie Brilliant Blue R-250-stained gels, it is 24.08%. The band detection sensitivity of the Image Lab software was set to high.

SDS-PAGE presents a time-consuming bottleneck in the assessment of samples at the various chromatographic steps of a protein purification procedure. Standard staining and destaining protocols with Coomassie stain can take at least two hours. Users may microwave gels for faster staining, but staining the gel interferes with blotting. Users often run a duplicate gel for blotting. Because methods are not standardized, results and gel backgrounds can vary between experiments and between users, as different staining and destaining times may be used to achieve the same sensitivity. Data preservation takes more time, as gels need to be dried. In a typical laboratory, gel rocker platforms are stacked with gels at different stages of data processing: staining, destaining, or waiting to be dried.

The Criterion Stain Free system removes a major obstacle from SDS-PAGE protein analysis by eliminating staining, destaining, and gel drying. Fraction samples and molecular weight markers are loaded on the Criterion Stain Free precast gels using conventional SDS-PAGE protocols. After electrophoresis, the gel is removed from the cassette and loaded into the imager, and the start button is pressed: That's all. The software automates signal development and imaging, and protein bands start to appear. Depending on your needs, analysis is complete in 2.5 to 5 minutes. Sensitivity is the same as or better than that of Coomassie staining. Automated processing ensures reproducible results without background variations. The gels are compatible with downstream applications such as western blotting and mass spectrometry. Digital data storage and sharing eliminates the need for gel drying.

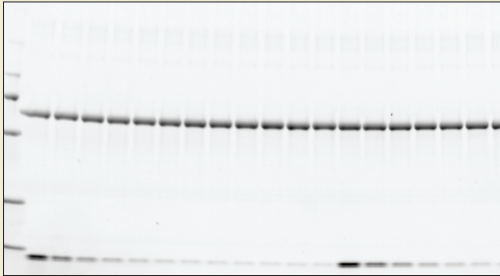
The Criterion Stain Free system maintains usage of SDS-PAGE as the standard method for monitoring protein sample preparation but speeds up initial screening of sample material.



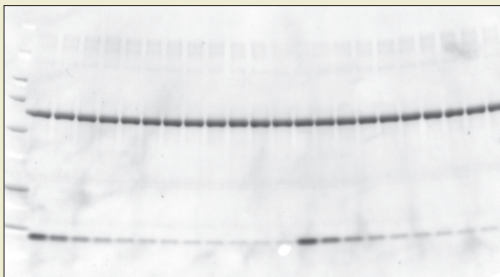


The Criterion Stain Free system allows the user to quickly check the transfer quality of blots. Protein samples retain their fluorescence after the gels are visualized and can be viewed on the blotting membrane after transfer. Users now have a tool to monitor the gel and blot for quality of the transfer.

Gel image before transfer



Blot after transfer



Gel image after transfer



Images produced using the Criterion Stain Free system.

**Criterion Stain Free Gel Imaging System Overview**  
**Precast Gels With Protein Visualization Compound**

Criterion Stain Free gels are formulated with Tris-HCl for PAGE applications and are made without SDS. With SDS omitted from the running buffer, the gels can be used to run proteins under nondenaturing conditions for subsequent analysis of native conformation and activity. To run denaturing gels, simply use a running buffer that contains SDS.

**Buffer Choices by Application**

Gel Type	Application	Sample Buffer	Running Buffer
Tris-HCl	SDS-PAGE	Laemmli	Tris/glycine/SDS
	Native PAGE	Native	Tris/glycine

**Single-percentage resolving gels:**

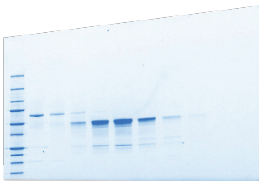
Choose a single-percentage gel when your sample has a limited size range of molecules and your goal is to separate a single band from neighboring bands. These gels will produce the greatest separation between bands with similar molecular weights. Single-percentage gels are cast with a 4% stacking gel to further sharpen protein bands before they enter the resolving gel.

**Linear gradient gels:**

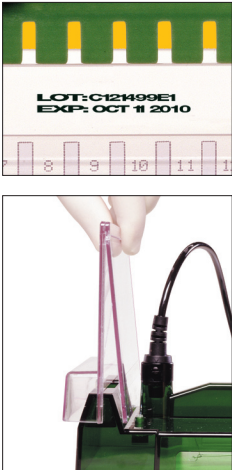
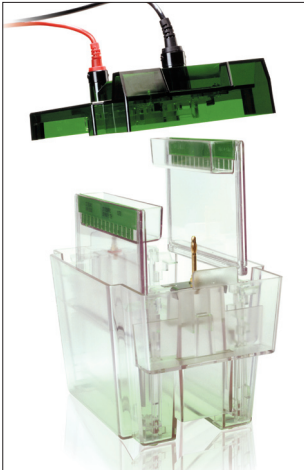
Choose a linear gradient gel if your sample contains a wide range of molecular weights. These gels allow both high and low molecular weight bands to be visualized on the same gel.

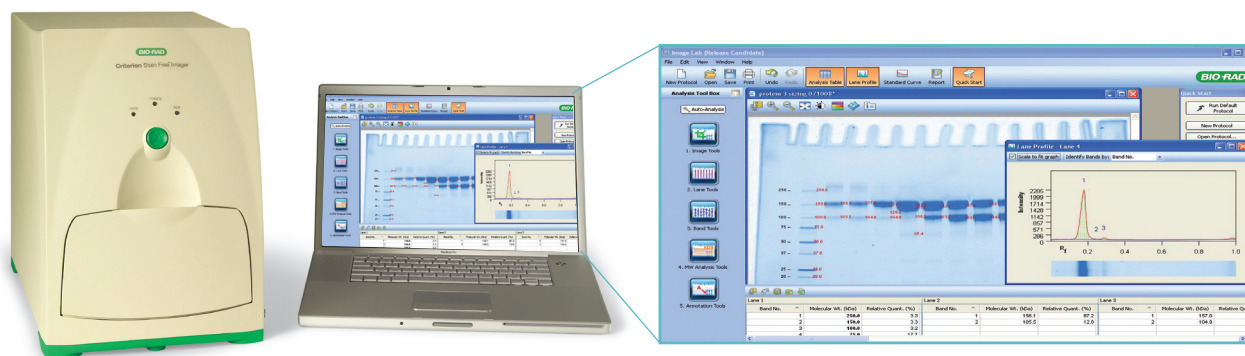
**Configurations of Criterion Stain Free Tris-HCl Gels**

Gradient	Wells	Sample Volume
10% resolving gel	12+2	45 µl
10% resolving gel	18	30 µl
4–20% linear gradient	12+2	45 µl
4–20% linear gradient	18	30 µl
4–20% linear gradient	26	15 µl
8–16% linear gradient	IPG+1 well	11 cm IPG strip



Footprint, 26 x 44 cm; weight, 8 kg.





### Criterion Stain Free Imager

The Criterion Stain Free imager is a compact instrument with a sample tray for loading precast gels and a convenient start button to initiate automated protein visualization and analysis.

Designed with feedback from scientists involved in biopharmaceutical research, the imager is small and practical. It is designed with user-friendly features such as the power button and serial number located near the front of the instrument, a four-step quick guide displayed on the sample tray, and a slip-free tray handle. The Criterion Stain Free imager is a simple and easy-to-use platform designed from start to finish with the customer in mind.

### Image Lab Software

Image Lab software is a novel tool designed for one-touch SDS-PAGE imaging and analysis automation in the Criterion Stain Free system. Life science researchers helped create Image Lab software, resulting in an easy-to-use interface that offers multiple image optimization and analysis features, including molecular weight determination and purity assessment. Researchers can save imaging and analysis settings in Protocols, and with a touch of the start button on the Criterion Stain Free imager, Image Lab software choreographs the automated protein signal activation, gel imaging, and analysis to quickly produce high-quality, reproducible results.

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### Ordering Information

Catalog # Description

#### Criterion Stain Free System

170-8160 Criterion Stain Free System, includes imager and software

#### Criterion Stain Free Gels

345-1012 10% Tris-HCl 12-Well Resolving Gel  
345-1018 10% Tris-HCl 18-Well Resolving Gel  
345-0412 4–20% Tris-HCl 12-Well Linear Gradient  
345-0418 4–20% Tris-HCl 18-Well Linear Gradient  
345-0426 4–20% Tris-HCl 26-Well Linear Gradient  
345-8161 8–16% Tris-HCl 1 IPG+1-Well Linear Gradient

#### Criterion Gel Apparatus

165-6001 Criterion Cell, includes tank, lid with power cables, three sample loading guides  
165-6019 Criterion Cell and PowerPac™ Basic Power Supply  
166-4138 Criterion™ Dodeca™ Cell and PowerPac HC Power Supply, runs 1–12 precast gels  
170-4070 Criterion Blotter With Plate Electrodes  
170-4071 Criterion Blotter With Wire Electrodes

#### Power Supplies

164-5052 PowerPac HC Power Supply  
164-5070 PowerPac Universal Power Supply  
164-5056 PowerPac HV Power Supply  
164-5059 PowerPac HV Power Supply With Temperature Probe

Catalog # Description

#### Protein Standards

161-0363 Precision Plus Protein™ Unstained Standards, 10–250 kD  
161-0317 SDS-PAGE Standards, broad range, 200 µl  
161-0304 SDS-PAGE Standards, low range, 200 µl  
161-0303 SDS-PAGE Standards, high range, 200 µl

#### Criterion Gel Accessories

165-6006 Criterion Sample Loading Guide, 12+2-well, 1  
165-6007 Criterion Sample Loading Guide, 18-well, 1  
165-6008 Criterion Sample Loading Guide, 26-well, 1

#### Premixed Running Buffers

161-0732 Tris/Glycine/SDS, 1 L  
161-0772 10x Tris/Glycine/SDS, 5 L  
161-0734 10x Tris/Glycine, 1 L  
161-0771 10x Tris/Glycine, 5 L

#### Premixed Sample Buffers

161-0737 Laemmli Sample Buffer, 30 ml  
161-0738 Native Sample Buffer, 30 ml

#### Individual Reagents

161-0301 SDS, 100 g  
161-0404 Bromophenol Blue, 10 g  
161-0611 Dithiothreitol (DTT), 5 g  
161-0710 2-Mercaptoethanol, 25 ml  
161-0718 Glycine, 1 kg  
161-0719 Tris, 1 kg

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