ChemiDoc™ Touch Imaging System

Sensitivity in detection, power in quantitation

BIO-RAD

ChemiDoc Touch Imaging System

Best-in-class performance

Superior to film in signal-to-noise ratio

Equal to film in sensitivity and resolution

High-quality imaging of gels and western blots

Highly intuitive Image Lab™ Touch Software

Streamlined path from experiment to usable data

Stain-free enabled

Publication-quality images at your fingertips

HIGH-PERFORMANCE IMAGING

EASY, FLEXIBLE INTERACTION

STAIN-FREE ENABLED

WESTERN BLOTTING CONSUMABLES

High-Performance Imaging

As sensitive as film, with advanced blot detection technology to determine best exposure for faint and intense bands

Easy Acquisition Features

Includes image preview, auto-focus, auto-exposure, and additional exposure options

Convenience in Storing and Sharing Data

Export images via USB or network connection

Assess Images at the Point of Acquisition

Pinch and zoom images on the 12-inch touch screen; access a range of tools with Image Lab Touch Software

Smart Tray Technology™

Automatically recognizes your application

Chemiluminescent blots, stain-free gels/ blots, and ethidium bromide, SYPRO Ruby, and other stains.

Coomassie Blue, silver, and other stains.

GelGreen or any SYBR® Stains.

HIGH-PERFORMANCE IMAGING

Get the sensitivity of film without the hassles of film processing, darkroom chemicals, or associated mishaps. Combine this sensitivity with a suite of tools to optimize imaging and quantitation, and achieve an unmatched ability to resolve the faintest and most intense bands into meaningful data.

The ChemiDoc Touch Imaging System is comparable to film …

Detect low signal at the same exposure time

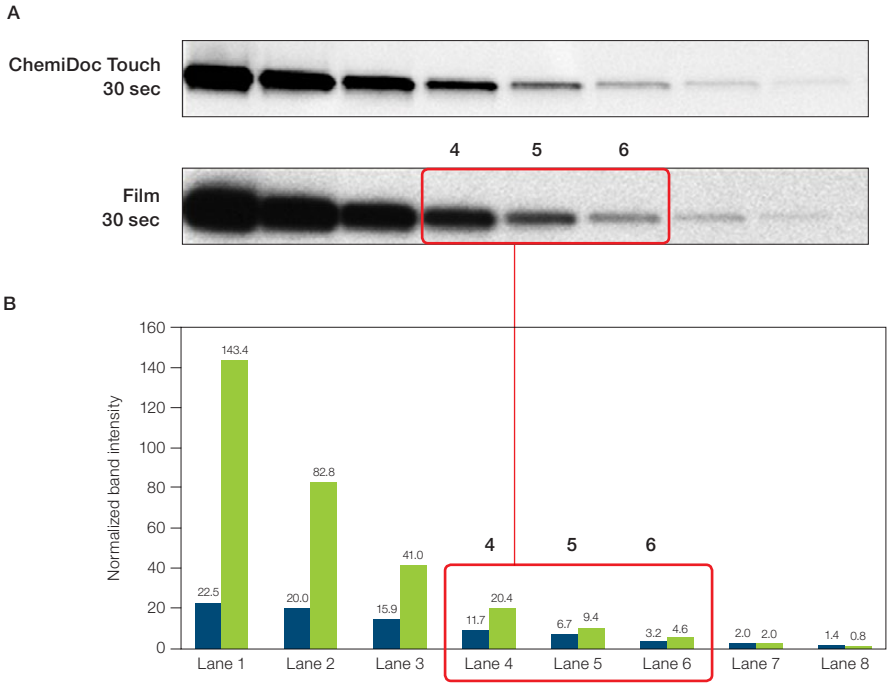


Fig. 1. Comparison of sensitivity between the ChemiDoc Touch Imaging System and film. A, western blot analysis of *LacI* expression was conducted using 2x serial dilutions (starting at 0.31 µg protein) of *E. coli* cell lysate. The membranes were either imaged on the ChemiDoc Touch Imaging System for 30 sec or exposed to film for 30 sec. **B**, the normalized band densities illustrate the ability of the ChemiDoc Touch Imaging System to detect low signal bands at the same exposure time as film. The red boxes represent the limited linear dynamic range of film. ChemiDoc Touch Imaging System, 30 sec (■); film, 30 sec (■).

… and in many cases the ChemiDoc Touch Imaging System is superior to film.

Reveal faint protein bands missed by film.

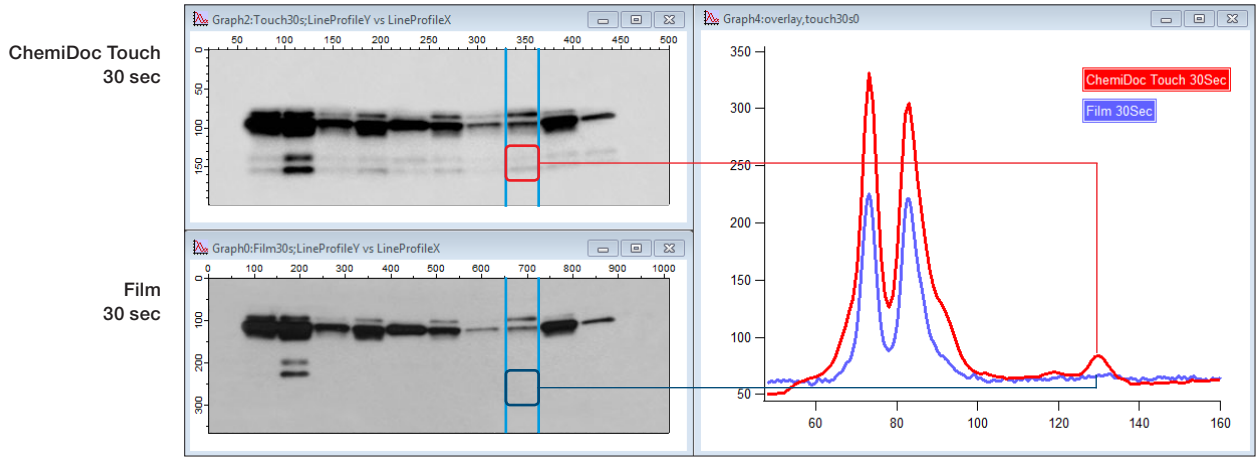


Fig. 2. Side-by-side comparison between the ChemiDoc Touch Imaging System and film. Levels of the three isoforms of the pro-apoptotic protein Bim were measured in various cell lines using western blot analysis. The membranes were either imaged on the ChemiDoc Touch Imaging System for 30 sec or exposed to film for 30 sec to compare detection sensitivities. As shown by the overlay graph, the ChemiDoc Touch Imaging System was better able to detect faint protein bands than film.

Best-in-Class Digital Image Quality

Comparison of the ChemiDoc Touch Imaging System with other digital imagers

Fig. 3. Comparison between the ChemiDoc Touch Imaging System and other digital imagers. A, western blot analysis for p44/42 MAPK (Erk1/2) expression was conducted using 2x serial dilutions (starting at 10 µg protein) of Jurkat cell lysate. The membranes were imaged on either the ChemiDoc Touch Imaging System or digital imagers from other vendors for a 15 sec exposure. As shown, the ChemiDoc Touch Imaging System is able to produce images with better definition and differentiation between closely spaced bands. **B**, the graph demonstrates the ability of the ChemiDoc Touch Imaging System to detect the same faint bands with greater intensity.

EASY, FLEXIBLE INTERACTION

Image Lab Touch Software takes the guesswork out of imaging and puts publication-quality images at your fingertips in seconds. Acquire images with a rapid 3-step workflow. Engage a full complement of digital tools to assess, select, and export your images.

An Intuitive Acquisition Workflow

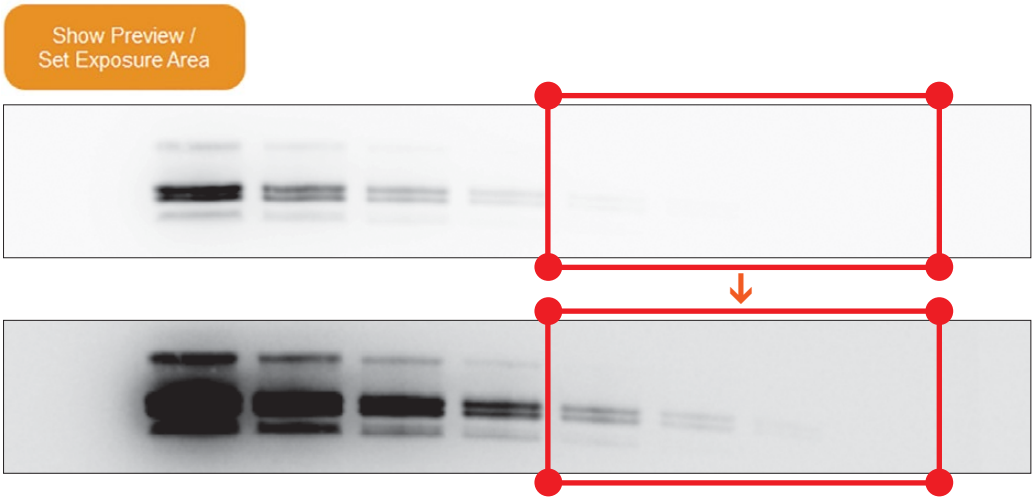
Acquiring images is simple and fast.

Easy workflow: Define image size (touch-pinch to zoom) → Select gel or western blot application → Set exposure controls → Acquire image

Optimize Exposure for Analysis and Target Key Bands

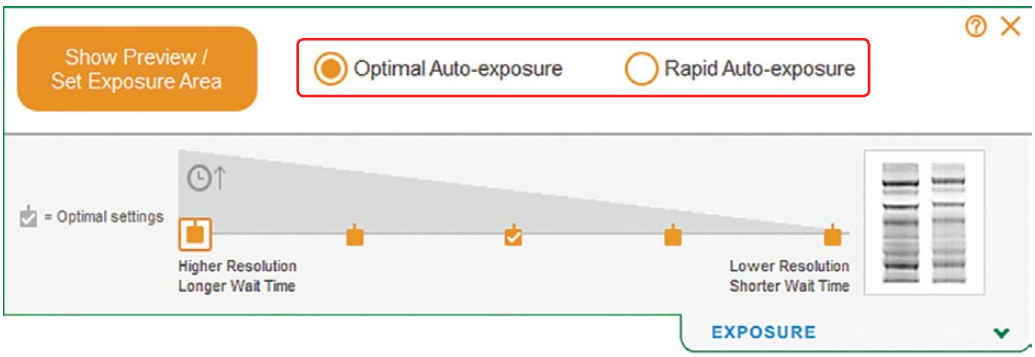
Define auto-exposure region for the optimal measurement of your bands of interest.

1



Previewing the image lets you highlight an area of interest on a blot image to acquire the clearest signal from that area.

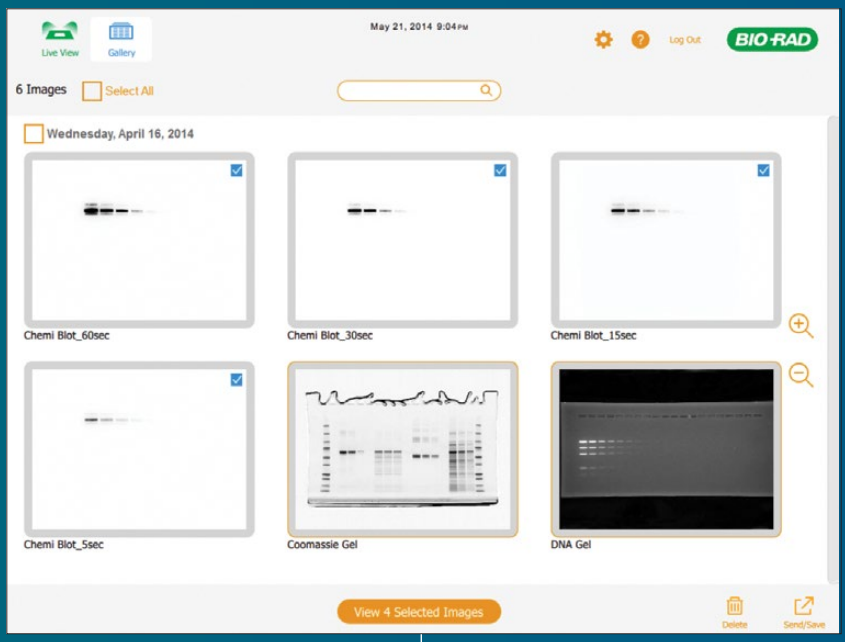
2



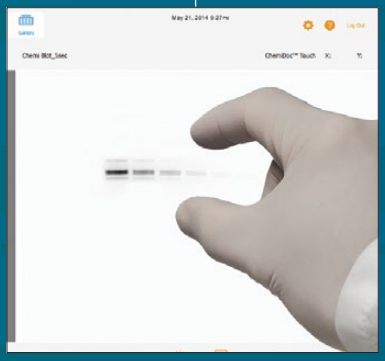
Choose the exposure depending on your need for either fast qualitative analysis (Rapid Auto-exposure) or in-depth quantitative analysis (Optimal Auto-exposure) of the blot.

Assess and Export Images in the Gallery

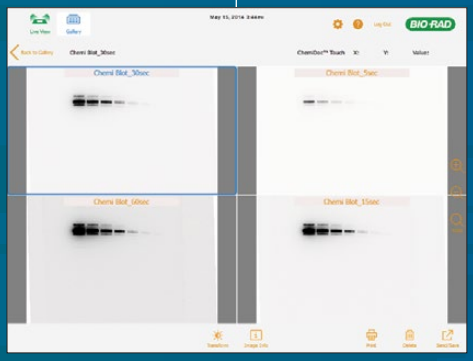
The ChemiDoc Touch Imaging System has an intuitive interface to make reviewing, selecting, and exporting your images efficient and straightforward.



Gallery view enables you to peruse raw images



Pinch and zoom for a closer look



Compare up to 4 exposures side by side

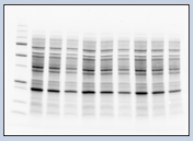
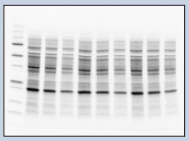
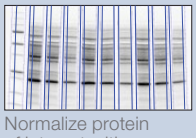
Export and print via USB or Ethernet connection

STAIN-FREE ENABLED

The ChemiDoc Touch Imaging System fully supports Bio-Rad's unique stain-free gel technology. Using the ChemiDoc Touch Imaging System as part of the V3 Western Workflow brings a new level of quality control and quantitation to the western blotting process, allowing multiple points at which to visualize, verify, and validate results.

V3 Western Workflow™

The V3 Western Workflow streamlines the western blotting protocol, incorporating stain-free in-gel chemistry to allow rapid fluorescent detection of proteins for gels and blots as well as the use of total protein normalization as a loading control. This improved workflow saves time and increases accuracy and reliability throughout the western blotting process.

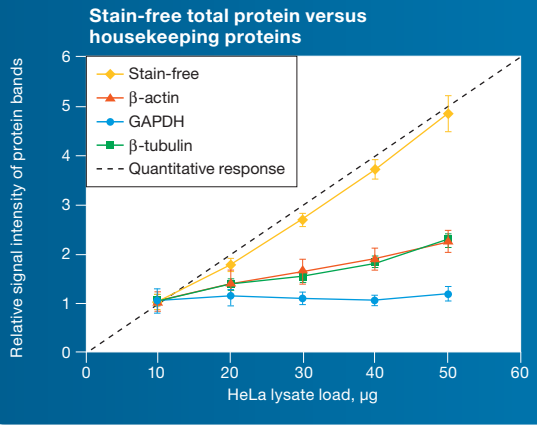
Workflow	Benefit
Separate Proteins 1 	**Run gels in as little as 15 min** ▪ Speed with flexibility: TGX Stain-Free™ Gel chemistry available in precast and handcast formats
Visualize Protein Separation 2   Stain-free image of pretransferred gel	**Visualize separation for all lanes in 1 min** ▪ Coomassie-like performance with no background variability and no staining/destaining
Transfer 3 	**Efficient and uniform protein transfer in 3 min** ▪ Throughput: transfer 4 mini gels at once
Verify Transfer Efficiency 4   Stain-free image of blot	**Quickly assess transfer efficiency** ▪ Verify quality of transfer for all lanes in 2 min
Detect Proteins 5  	**Immunodetection of proteins** ▪ Highly specific protein detection using extensively validated western blotting PrecisonAb™ Antibodies ▪ High signal duration and sensitivity with Clarity™ and Clarity Max™ ECL Substrates
Validate Western Blot Data by Normalization and Analysis 6   Detect protein of interest  Normalize protein of interest with stain-free image of blot from step 4	**Use stain-free blot image as total protein loading control** ▪ No need to strip and reprobe ▪ Use the entire protein sample in one lane; not dependent on a single housekeeping protein ▪ Reliable, accurate, and publishable quantitative data

Total Protein Normalization

Stain-free gel chemistry makes it possible to use total protein levels as a loading control rather than the housekeeping proteins used in traditional western blotting protocols. This negates the need to strip and reprobe the blot and avoids the attendant errors that can be introduced in this step.

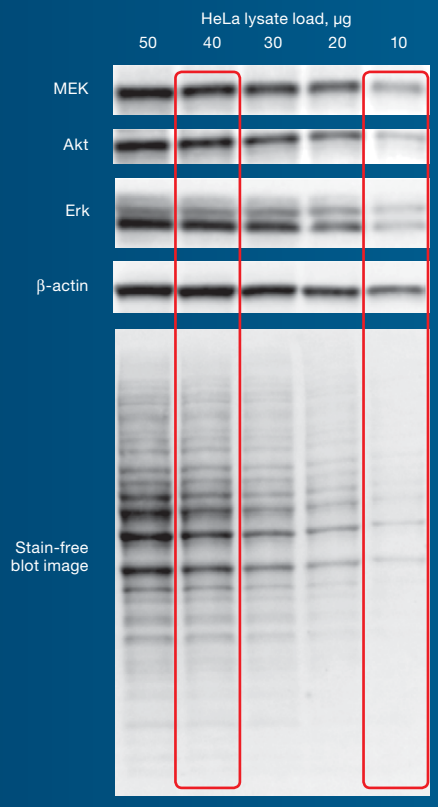
Using total protein normalization produces a much greater linear dynamic range for measuring target protein levels. Housekeeping proteins such as β-actin, β-tubulin, or GAPDH are often very abundant in biological samples, which results in their signal being oversaturated compared to target proteins. Normalizing results to a total protein measurement corrects this problem, allowing a meaningful comparison even with low-abundance targets, and leads to far greater quantitative accuracy in measuring proteins of interest.

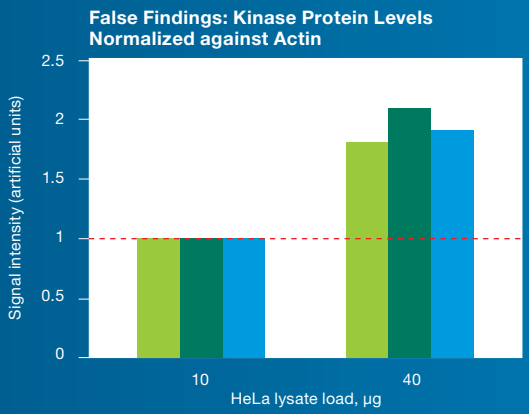
1 MORE RELIABLE to quantitate the protein load



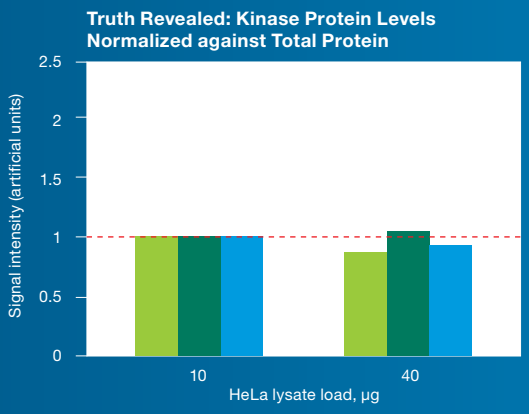
Linearity comparison of stain-free total protein measurement and immunodetection of three housekeeping proteins in 10–50 µg of HeLa cell lysate.

2 AVOID FALSE FINDINGS caused by housekeeping protein signal saturation





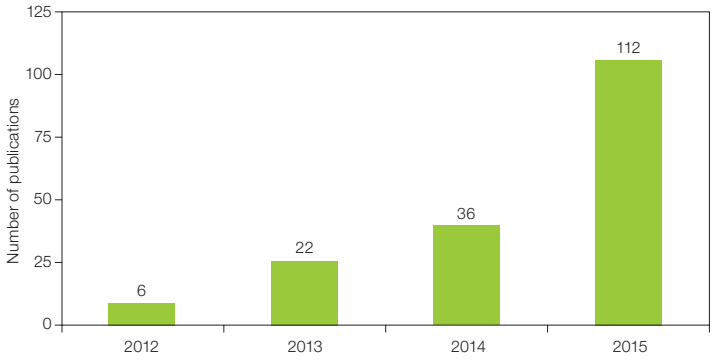
Comparison of kinase protein levels normalized by stain-free total protein or actin loading controls. 10–50 µg of HeLa cell lysate from the same sample were loaded onto a stain-free gel to probe MEK (■), Akt (□), and Erk (□). There should be no changes in the kinase protein levels when data are normalized. Expected value (---).



THE NEW GOLD STANDARD

Stain-free technology and, as a result, total protein normalization (TPN) are becoming increasingly popular in western blotting procedures. Major scientific journals are now asking researchers to conduct TPN preferentially over housekeeping normalization. In addition to the ChemiDoc Touch System, Bio-Rad also offers TGX Stain-Free Gels to support this more accurate quantitation method.

Peer-Reviewed Publications Using Total Protein Normalization



Stain-free total protein staining is a superior loading control to β-actin for western blots.
Gilda JE, Gomes AV (2013). Anal Biochem 440, 186–188.

V3 stain-free workflow for a practical, convenient, and reliable total protein loading control in Western blotting.
Posch A, Kohn J, Oh K, Hammond M, Liu N (2013). J Vis Exp, video ID 50948.

Rapid and precise engineering of the *Caenorhabditis elegans* genome with lethal mutation co-conversion and inactivation of NHEJ Repair.
Ward JD (2015). Genetics 199, 363–377.

Contractile properties and sarcoplasmic reticulum calcium content in type I and type II skeletal muscle fibres in active aged humans.
Lamboley CR, Wyckelsma VL, Dutka TL, McKenna MJ, Murphy RM, Lamb GD (2015). J Physiol 593, 2499–2514.

Alteration of mTOR signaling occurs early in the progression of Alzheimer disease (AD): Analysis of brain from subjects with pre-clinical AD, amnestic mild cognitive impairment and late-stage AD.
Tramutola A, Triplett JC, Di Domenico F, Niedowicz DM, Murphy MP, Coccia R, Perluigi M, Butterfield DA (2015). J Neurochem 133, 739–749.

Visit **bio-rad.com/V3publications** for a comprehensive list of publications using stain-free technology.

Incorporate TPN into Your Workflow with TGX Stain-Free Gel Chemistry

TGX Stain-Free products are designed with stain-free gel chemistry to provide superior gel performance and eliminate the need for staining. Compatible with standard sample and running buffers, TGX Stain-Free products allow you to

- Quickly visualize proteins — no staining required
- Run gels in as little as 15 min
- Efficiently transfer proteins in as little as 3 min

They are available in multiple formats for your convenience:

- TGX Stain-Free Precast Gels — Mini-PROTEAN® (mini) and Criterion™ (midi) Gels optimized for western blotting

Mini-PROTEAN Gels — **bio-rad.com/MiniStainFree1**
Criterion Gels — **bio-rad.com/MidiStainFree1**

- TGX Stain-Free™ FastCast™ Acrylamide Solutions — premixed acrylamide solutions for hand casting polyacrylamide gels

FastCast Solutions — **bio-rad.com/SFFastCast1**

WESTERN BLOTTING CONSUMABLES

The ChemiDoc Touch Imaging System is part of Bio-Rad's range of products to improve the entire western blot process, from immunoprecipitation all the way through to data analysis. These consumables provide workflow optimizations and better results for a variety of laboratory needs.

Immunoprecipitation with SureBeads™ Magnetic Beads

For protein complex pull-down and isolation of low-abundance targets

- Faster and easier way to immunoprecipitate — say yes to magnetization, no to centrifugation
- Patented surface chemistry enables proper antibody orientation, which maximizes antigen binding capacity
- Ergonomically designed 16-tube SureBeads Magnetic Rack has strong separable magnets to minimize sample handling and is fast, easy to use, and affordable.

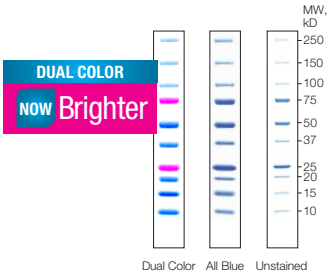
bio-rad.com/MagneticIP

Precision Plus Protein™ Standards

Designed for accurate molecular weight estimation

- Precision Plus Protein Dual Color Standards — brighter for easier target protein identification and can yield stronger band intensity after blot processing
- Precision Plus Protein All Blue Standards — recommended for colorimetric visualization on stain-free gels
- Precision Plus Protein Unstained Standards — provide stain-free visible ladder

bio-rad.com/PrecisionPlus1



Prepacked Transfer Consumables

All the resources needed for a fast and efficient transfer process

- Trans-Blot® Turbo™ Transfer Packs reduce setup time to 1 min from the opening of the gel cassette to the start of your transfer
- Ready-to-assemble (RTA) transfer kits provide all consumables needed to transfer 40 blots, including transfer buffer and transfer stacks available with nitrocellulose, PVDF, or low fluorescence PVDF membranes. A cost-effective and easy-to-use solution for protein transfers

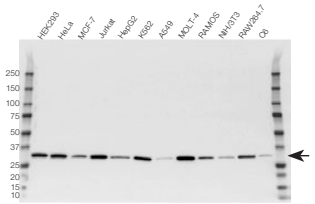
bio-rad.com/TransBlotTurbo

PrecisionAb Antibodies

Rigorously validated to work every time

- Highly specific and extensively validated with up to 12 cell lysates
- Strict quality control for lot-to-lot consistency
- Trial size for cost effective evaluation
- Positive control lysate to facilitate target identification

bio-rad.com/WBantibodies



Clarity and Clarity Max Western ECL Substrates

Compatible with any HRP-conjugated secondary antibody

The perfect solution for detecting high- and low-expressing proteins, even when taking multiple exposures.

- Clarity Substrate — moderate sensitivity, long signal duration, and two-year shelf life at room temperature
- Clarity Max Substrate — for when you need high sensitivity

bio-rad.com/ClarityECL

Specifications

Automation Capabilities	
Smart Tray Technology	ChemiDoc Touch Imaging System automatically recognizes your application-specific tray and adjusts imaging parameters and software options accordingly
Autofocus	Precalibrated focus for any zoom setting or sample height
Auto-exposure	— two user-defined modes (rapid or optimal auto-exposure) for chemiluminescence — two user-defined modes (faint or intense bands) for nonchemiluminescence applications
Image flat fielding	Dynamic; precalibrated and optimized for every application
Hardware Specifications	
Touch screen functionality	Multitouch capable (4 points) 12.1" display
Maximum image area (L x W)	16.8 x 21 cm
Illumination source	Trans-UV, 302 nm (standard) Epi-white (standard) Trans-white (optional) Trans-blue (optional)
Detector	Cooled CCD, 6 megapixels
Camera cooling temperature	–25ºC
Filter holder	Two positions (one for standard filter, one without filter for chemiluminescence)
Emission filter	Standard filter to perform protein and DNA gel and blot imaging
Dynamic range	>4 orders of magnitude
Data output	16-bit or 8-bit; SCN, TIFF, JPEG image files
Instrument weight	35 kg (78 lbs)
Instrument size (L x W x H)	61 x 51 x 53 cm
Operating voltage	100–250 V
Operating temperature	10–28ºC
Operating humidity	10–85% relative humidity (noncondensing)

Ordering Information

Catalog #	Description
1708370	**ChemiDoc Touch Imaging System**, includes internal computer, 12" touch-screen display, camera, Image Lab Touch Software, chemi/UV/stain-free sample tray, Clarity Western ECL Substrate, Precision Plus Protein Dual Color Standards
1708381	**ChemiDoc Touch V3 Western Workflow for Mini Gels**, includes ChemiDoc Touch Imaging System with Image Lab Touch Software, chemi/UV/stain-free sample tray, 50 Any kD™ Mini-PROTEAN TGX Stain-Free Precast Gels, SDS-PAGE accessories, Clarity Western ECL Substrate, Precision Plus Protein Dual Color Standards, Mini-PROTEAN Tetra Cell, Trans-Blot® Turbo™ Transfer Starter System, 50 PVDF transfer packs for mini gels
1708382	**ChemiDoc Touch V3 Western Workflow for Midi Gels**, includes ChemiDoc Touch Imaging System with Image Lab Touch Software, chemi/UV/stain-free sample tray, 50 4–20% Criterion TGX Stain-Free Precast Gels, SDS-PAGE accessories, Clarity Western ECL Substrate, Precision Plus Protein Dual Color Standards, Criterion Cell, Trans-Blot Turbo Transfer Starter System, 50 PVDF transfer packs for midi gels
Accessories	
1708372	**White sample tray**, for gels stained with Coomassie Blue, copper, silver, or zinc stains
1708373	**Blue sample tray**, with viewing goggles, for gels stained with GelGreen or any SYBR® Stains
1708374	**Chemi/UV/stain-free sample tray**, for chemiluminescent blots, stain-free gels/blots, and gels stained with ethidium bromide, SYPRO Ruby, Oriole™, GelRed, and SYBR® Stains.
1708375	**UV safety shield**, to protect against UV light exposure during band excision
1708376	**Gel alignment templates**, for consistent placement of gels and blots
1708377	**Holder for sample trays and UV shield**
1708378	**ChemiDoc Touch IQ/OQ protocols**, for installation qualification/ operational qualification
1708097	**Standard 302 nm UV lamps**, pkg of 6
1708089	**Mitsubishi Thermal Printer**
1707581	**Mitsubishi Thermal Printer Paper**, 4 rolls
Software	
1709690	**Image Lab Software**, stand-alone version, PC or Mac, for viewing images and 1-D analysis

Visit **bio-rad.com/CDTinfo** to learn more about the ChemiDoc Touch Imaging System.

BIO-RAD

Bio-Rad Laboratories, Inc.

Life Science Group

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