GE Healthcare

Beautifully reproducible results

Ettan 2-D Electrophoresis

Beautifully reliable, consistently reproducible 2-D electrophoresis

At GE Healthcare we are dedicated to ensuring that you have the tools you need to achieve your aims in the most demanding proteomics applications, consistently and reliably. You and thousands of your colleagues have already testified to the outstanding performance of our 2-D electrophoresis platform in tens of thousands of publications. Our aim is to continue providing you with cutting-edge 2-D electrophoresis solutions that add certainty and speed without compromising resolution, capacity or throughput.

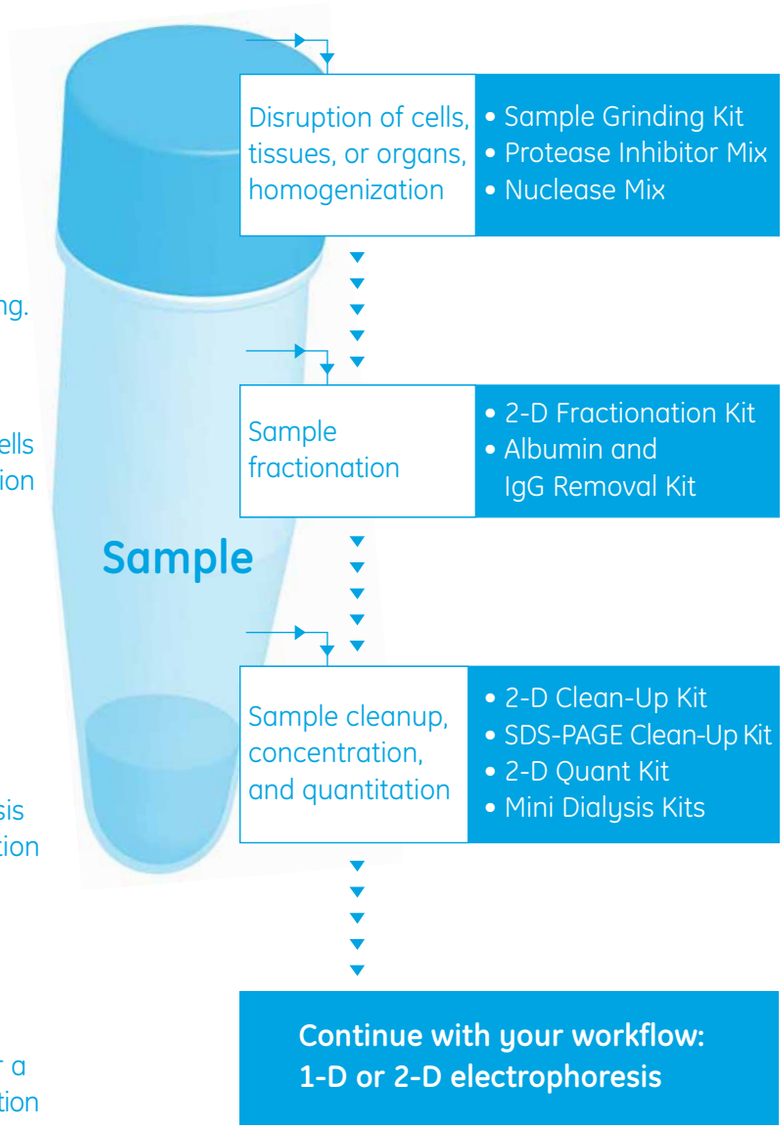
The latest additions to our 2-D electrophoresis platform include new products and improved and updated versions of products you have already come to rely on to help you produce results you can trust, day in, day out.

Experience the enhanced capabilities of the Ettan™ IPGphor™ 3 IEF system and Ettan IPGphor Manifold Light for providing high-throughput, first dimension isoelectric focusing. Get the power to see more with the cutting-edge Ettan DIGE Imager and the ImageQuant™ range of CCD-based imagers. Enhance the value of data derived from DeCyder™ 2-D analysis with the new DeCyder Extended Data Analysis software. Gain the flexibility offered by ImageMaster™ 2D Platinum software which now has a DIGE analysis module, allowing both non-DIGE and DIGE gels to be analyzed on the same platform.

Ettan Sample Preparation Kits and Reagents

Take control from stage one

Key proteins lost during initial sample preparation can never be recovered, which means that getting this first step right is crucial to obtaining reliable and accurate results. The Ettan range of kits and reagents remove the element of chance in protein isolation. They bring ease of use, reproducibility, and consistency to sample preparation for 2-D electrophoresis and Western blotting.



Cell lysis and homogenization

- Sample Grinding Kit provides efficient disruption of cells or tissues for protein extraction using homogenization
- Protease Inhibitor Mix prevents undesirable losses from 2-D maps caused by proteolytic activity
- Nuclease mix removes unwanted nucleic acids that can distort 2-D spot patterns

Sample fractionation

- 2-D Fractionation Kit uses inherent variations in protein solubility to isolate groups of proteins or fractions in your sample, allowing easier analysis
- Albumin and IgG Removal Kit improves the resolution of low-abundance proteins in 2-D electrophoresis of human serum with an adsorption gel that removes more than 95% albumin and IgG

Sample clean-up, concentration, and quantitation

- 2-D Clean-Up Kit and SDS-PAGE Clean-Up Kit offer a convenient and efficient solution for protein precipitation
- 2-D Quant Kit provides accurate and reliable quantitation of protein
- Mini Dialysis Kits enable convenient buffer exchange and desalting of small sample volumes

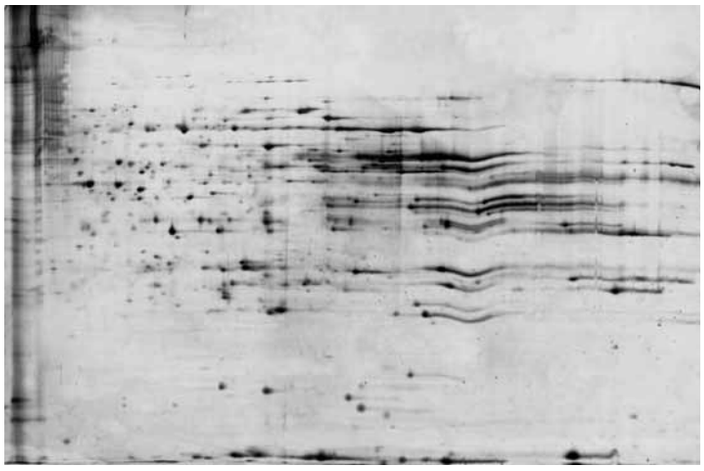
PlusOne™ ultrapure reagents

- Thiourea increases membrane protein solubility
- Iodoacetamide facilitates effective alkylation of thiols while minimizing reoxidation of competing thiol pairs in protein samples

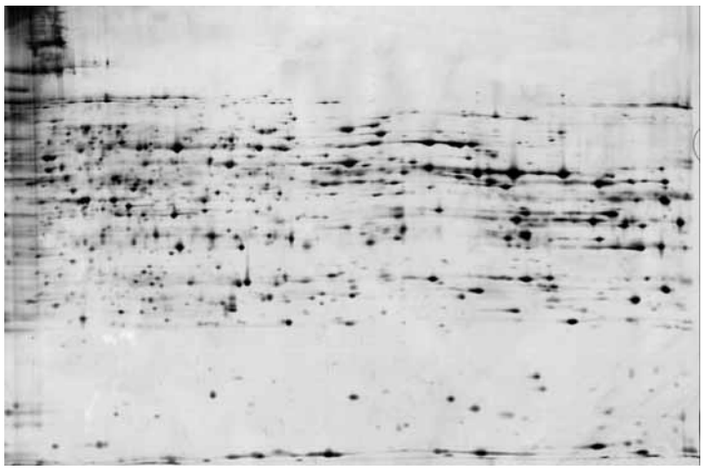
DeStreak Rehydration Solution

Put an end to streaking

Enhanced reproducibility with DeStreak Rehydration Solution



Problem with horizontal streaking



Problem solved with DeStreak Rehydration Solution

Two frequently encountered problems in 2-D electrophoresis are extra spots on 2-D gels caused by nonspecific oxidation and streaks that distort 2-D electrophoresis maps. Both of these problems result in poorly resolved protein patterns and reduced reproducibility between electrophoresis runs.

DeStreak™ Rehydration Solution effectively eliminates streaking and nonspecific oxidation, irrespective of sample load, pH range, or run length. This ensures the same stable and reproducible pattern in every analysis.

Streaking most commonly occurs when

- Running gels that contain regions with pH values greater than 7.0
- Sample load is increased
- IPG strip length is increased
- Narrow pH gradients are used

Ettan IPGphor 3

Greater reproducibility in the first dimension

Ettan IPGphor 3 IEF System provides an effective and convenient way of handling the first dimension of 2-D electrophoresis. The system provides reliability, reproducibility, speed, accuracy, high protein-loading capacity, and high throughput.

The integrated system of Ettan IPGphor 3 and Ettan IPGphor Manifold or Manifold Light is easy to use and capable of generating fast, reproducible runs. It also features full PC control.

Ettan IPGphor 3 Control Software gives you the power to control everything from your PC.

Advantages of the Ettan IPGphor 3 IEF System

- Accommodates one Ettan IPGphor Manifold tray or 1–12 strip holders for 7, 11, 13, 18, or 24–cm IPG strips
- Integral power supply and Peltier solid-state temperature control (15–30 °C)
- Programmable controller for voltage, temperature and time
- External PC software for controlling as many as four Ettan IPGphor 3 units simultaneously, each running a different set of run parameters
- Up to 10 protocols (nine steps each) can be saved, retrieved, and edited easily on the instrument or using the PC software

The Ettan IPGphor Manifold delivers first-dimension isoelectric focusing of micropreparative loads of proteins with speed, convenience, and reproducibility. Cup loading for analysis of very acidic or very basic proteins is also possible.

Ettan IPGphor Manifold and Manifold Light

A new level of efficiency in IEF

Ettan IPGphor Manifolds are high-throughput accessories for first-dimension isoelectric focusing of proteins using IPG strips. These manifolds meet the increasingly stringent demands of proteomics research by ensuring high-resolution, micropreparative protein analysis.

Ettan IPGphor Manifold and Manifold Light simplify isoelectric focusing of multiple samples and reduce first-dimension, hands-on time to a minimum. They significantly speed up the processing of micro-preparative loads in first-dimension analysis.

Designed for maximum performance and flexibility, the manifolds can handle 12 IPG strips simultaneously. Sample equilibration can also be performed in the same tray, saving substantial time.

Ettan IPGphor Manifold Light is constructed from a new leading-edge polymeric material and is ideal for routine general screening applications. It is easy to handle and is extremely robust.

The ceramic Ettan IPGphor Manifold exhibits exceptionally uniform thermal characteristics and is designed for the most stringent applications. The high heat conductivity of the ceramic material prevents any "hot spots" that can distort 2-D electrophoresis maps.

Ettan IPGphor Manifolds

- Flexible handling of IPG strips from 7 to 24 cm
- Convenient precut electrode pads and paper bridges
- Compatible with previous generation Ettan IPGphor systems

New Ettan IPGphor Manifold Light

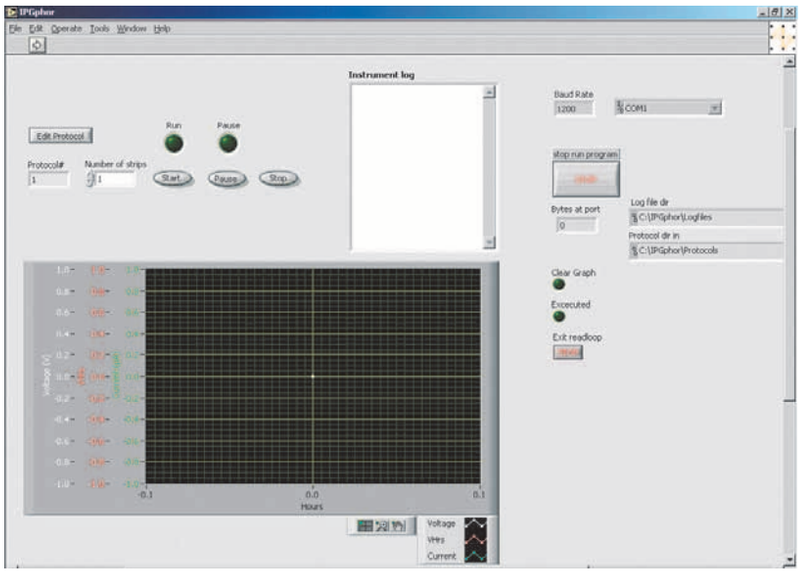
Ettan IPGphor 3 Control Software

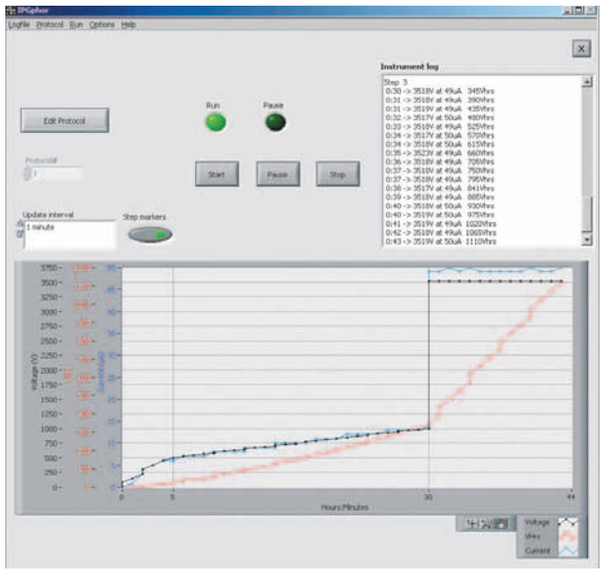
Full control from your PC

Up to four Ettan IPGphor 3 units can be simultaneously controlled by the Ettan IPGphor 3 Control Software, each processing a different set of run parameters.

Control software enables you to

- Start, stop, and pause IEF runs on the Ettan IPGphor 3
- Monitor voltage, current, and volt-hours of the run and generate a graphical display as it proceeds
- Store any number of protocols on a PC and rapidly load them to Ettan IPGphor 3
- Open and view stored log files of your previous runs, and export to other PC programs to produce professional reports





Graphic display of run parameters such as voltage, current, and volt-hours

Immobiline DryStrip gels and IPG Buffer solutions

Superior resolution in the first dimension

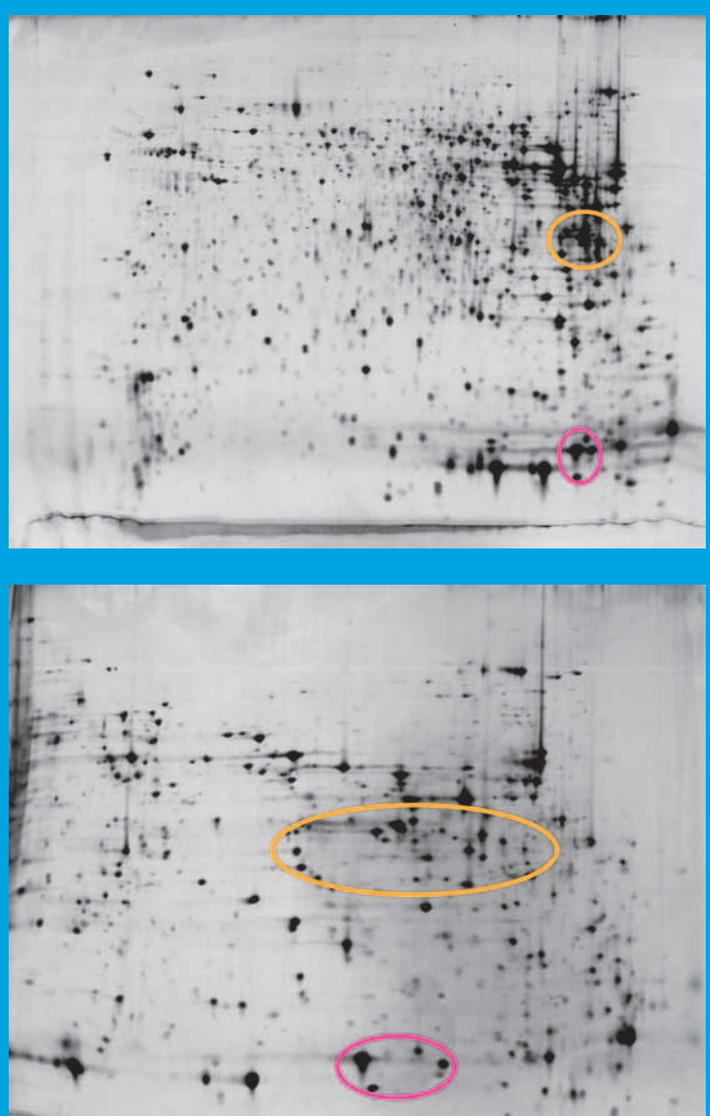
Immobiline™ DryStrip gels and IPG Buffer solutions enable you to achieve high-quality first-dimension IEF separations that pave the way for reproducible, high-resolution 2-D maps. The strips ensure stable pH gradients, high reproducibility and unrivaled resolution, without compromising throughput, loading capacity, or running conditions. This range gives you the widest choice of strip lengths and covers pH 3–11.

Immobiline DryStrip gels are individually barcoded and labeled with a unique serial number and pH range for easy sample tracking and handling. Bar coding minimizes the risk of mixing up samples and codes can be easily transferred to an electronic laboratory journal using a barcode reader.

Immobiline DryStrip gels for

- High batch-to-batch reproducibility
- Superior resolution and accuracy
- High sample loading
- 2-D DIGE analysis

Resolve a greater number of spots with Immobiline DryStrip

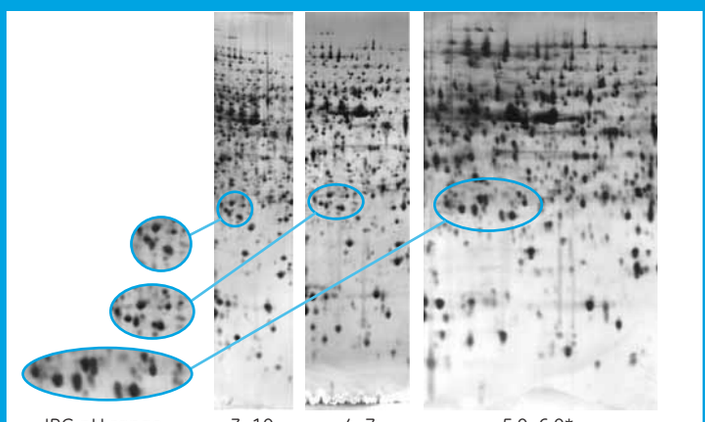


2-D map comparison of mouse liver extract run in the first dimension on new broad-range pH 3-11 NL Immobiline DryStrip (top) and medium-range pH 7-11 NL strip (bottom). Ovals of the same color indicate the same protein groups. A greater number of spots is resolved by the pH 7-11 NL strip, which increases your chances of successful protein identification and characterization.

See more basic spots and get a better overview of protein composition

The Immobiline DryStrip range provides the highest resolution and accuracy in the extreme basic region. Ettan DIGE IPG Buffer solutions improve protein solubility, ensure uniform conductivity and speed up focusing. With broad, medium and narrow pH intervals, Immobiline DryStrip gels simplify and accelerate the development of targeted strategies for analyzing complex protein mixtures.

A comprehensive range of IPG strips to suit most requirements is now available. Each strip comes in five lengths and includes linear and nonlinear ranges.

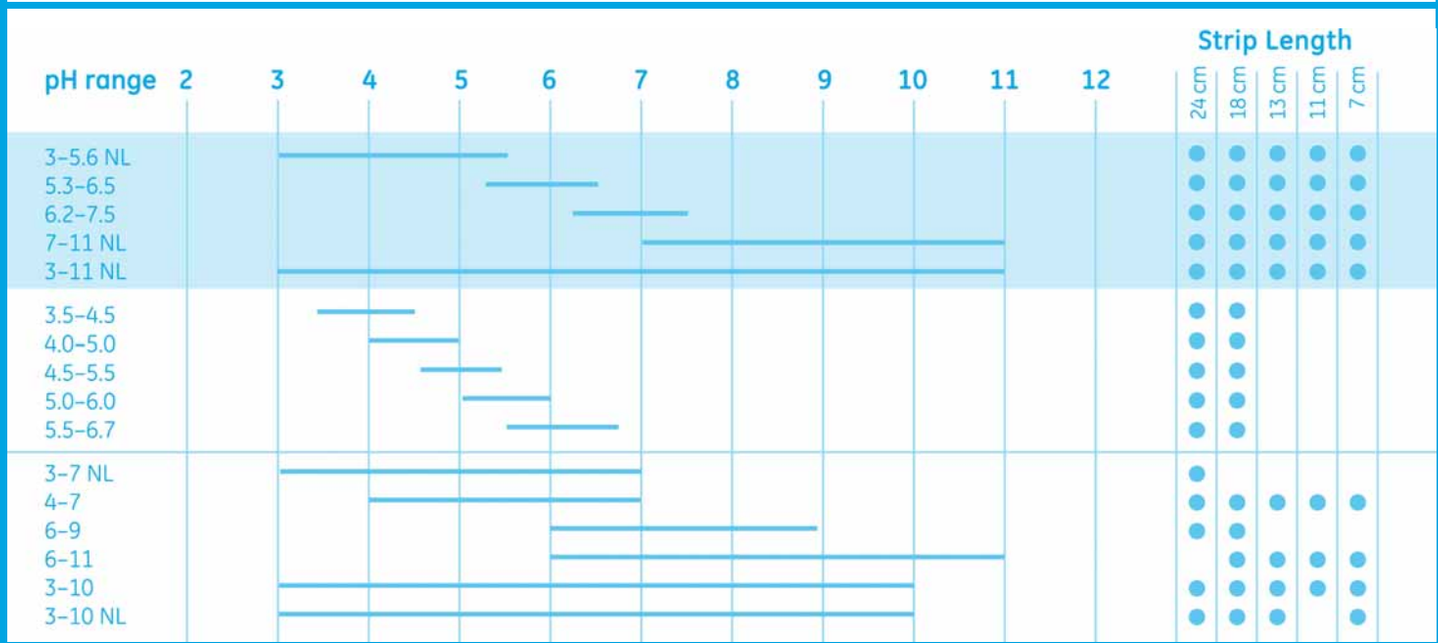


* In contrast to pH 3–10, using pH 5.0–6.0 reveals more spots at greater distances apart

Immobiline DryStrip range

- Broad-range pH 3-11 NL provides an overview of protein distribution
- Overlapping strips offer higher resolution and loading capacity
- IPG strips are available in 7, 11, 13, 18, and 24-cm strip lengths
- Longer strips provide increased resolution and loading capacity
- Shorter strips allow faster screening
- Greater detail and maximum sample loading are provided by high-resolution, medium-range and narrow-range strips
- Nonlinear pH gradients at the extreme ends of the pH scale distribute proteins more evenly over the gel length and maximize resolution

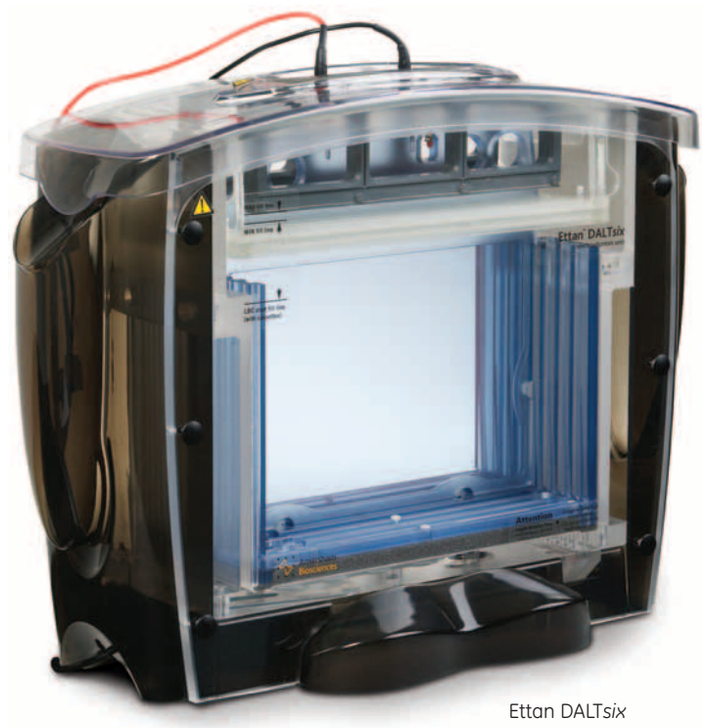
Guidelines for choosing Immobiline DryStrip gels



Ettan DALT electrophoresis systems

The power to see more in the second dimension

Ettan DALT systems with DALT precast gels ensure the highest resolution, without loss of reproducibility, on the largest gel formats available. In combination with 24-cm Immobiline DryStrip gels, Ettan DALT systems can resolve more discrete quantifiable protein spots than ever before.



Ettan DALT*six*

Run up to six gels simultaneously

The flexible, modular Ettan DALT*six* system comprises the Ettan DALT*six* Electrophoresis Unit, Gel Caster and Gradient Maker, a power supply, and a thermostatic circulator.

- Up to six lab-cast or precast gels of 26 x 20 cm in each run
- Simple-to-use 1.0 or 1.5-mm pre-assembled gel cassettes
- Ceramic heat exchanger and buffer circulation pump for efficient cooling
- Reproducible running conditions with the EPS 601 power supply

Simple gel casting

- PlusOne gel casting chemicals
- DALT*six* Gel Caster (up to six gels) and Gradient Maker for creating linear, convex, or concave gradients
- Pre-assembled gel cassettes for 1.0 or 1.5-mm thick gels
- Regular and low-fluorescent glass plates available

Electrophoresis of up to 12 large-format gels simultaneously

Ettan DALT*twelve* provides for higher-throughput needs. The unit includes an integrated pump, power supply and uses Peltier temperature control.

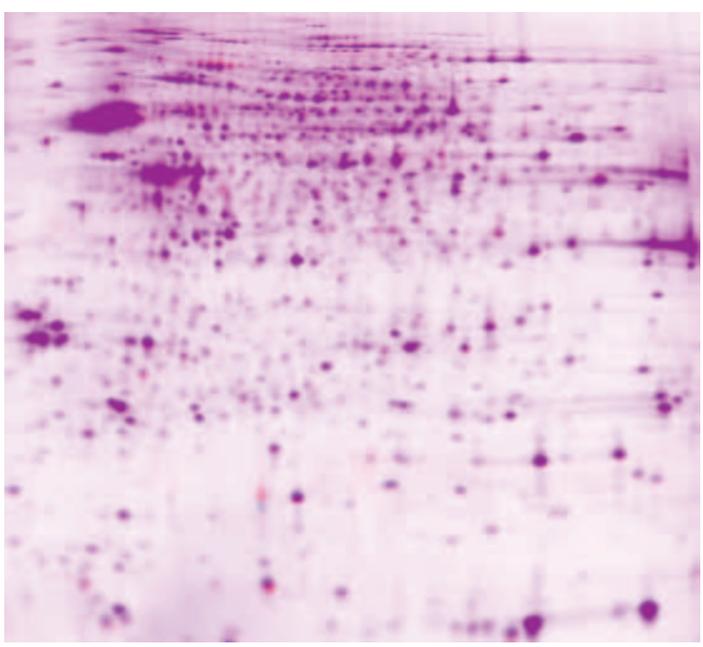
- Up to 12 lab-cast or precast gels of 26 x 20 cm in each run
- Simple-to-use 1.0- or 1.5-mm pre-assembled gel cassettes
- Programmable power supply and temperature control for high reproducibility between runs
- Designed to minimize buffer consumption

Convenient precast gels

Ready-to-use precast DALT Gel 12.5 (26 x 20 cm) and DALT Buffer Kit save time and add convenience.

- Stable buffer system in homogeneous (12.5% T) gel
- High batch-to-batch reproducibility
- Individual barcode and serial number for convenient sample tracking

Second-dimension separation with Ettan DALT*twelve* electrophoresis system



Typical 2-D DIGE overlay obtained using a two-dye staining approach in Ettan DIGE system. The image shows 5 µg mouse brain sample labeled with Cy™3 (red) and Cy5 (blue) CyDye DIGE Fluor saturation dyes included in CyDye DIGE Fluor labelling kits for scarce samples. First-dimension separation: Ettan IPGphor IEF system, 24-cm Immobiline DryStrip gel, pH 3-10 NL. Second-dimension separation: Ettan DALT*twelve* electrophoresis system, DALT Gel 12.5 (26 x 20 cm). Scanning: Typhoon 9410 Variable Mode Imager.

Ettan DALT*twelve*

Ettan DIGE system

Accurate results for confident decisions

Ettan DIGE systems use 2-D Fluorescence Difference Gel Electrophoresis (2-D DIGE)—the gold standard for protein abundance analysis. Most of the world's leading pharmaceutical and academic centers have switched to Ettan DIGE systems because of their unrivaled accuracy and dependability.

Ettan DIGE system brings new levels of statistical reliability to 2-D electrophoresis results. Each protein spot has its own internal standard, which gives outstanding accuracy and ensures that the smallest possible real differences in protein abundance are detected.

Consistent performance
The system uses CyDye™ DIGE Fluor dyes for multiplexing, the simultaneous co-separation of three multiple fluorescently labeled samples; including an internal standard, on a single gel. This is the most effective way to remove gel-to-gel variation and significantly increases accuracy and reproducibility.

Increased throughput, reduced costs
The system's level of accuracy and reproducibility creates another key benefit—results you can rely on, from far fewer gels than would otherwise be required. This means significant savings in consumables and analysis time. CyDye fluors are available in two formats, minimal labeling for general samples and saturation dyes for scarce samples.

For more information on our 2-D DIGE platform, request the brochure *Ettan DIGE is spot on for accuracy*, 11-0013-40.

Deep Purple Total Protein Stain

More volume, less noise

Visualization of proteins which have been separated by gel electrophoresis has traditionally been performed using Coomassie blue or silver staining. Fluorescent detection offers substantial advantages over these colorimetric methods, such as increased sensitivity, simple robust staining protocols and quantitative reproducibility over a broad dynamic range.

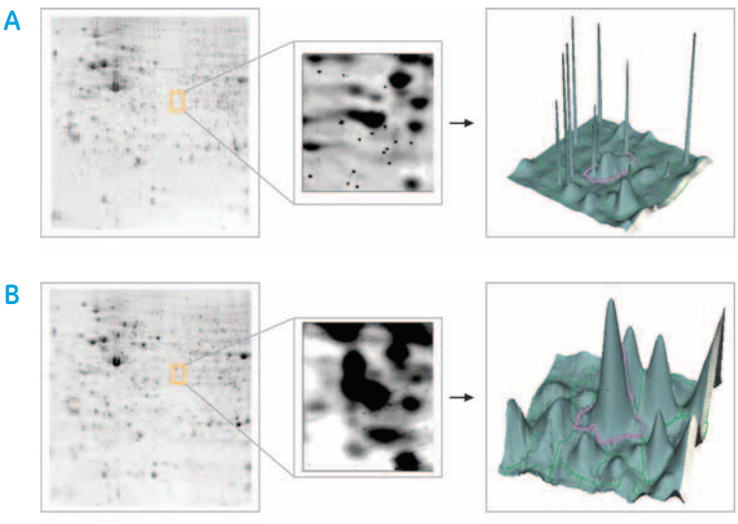
Deep Purple™ Total Protein Stain provides the most sensitive fluorescent staining available today. This protein stain provides superior 1-D and 2-D gel image data, with higher sensitivity and clearer backgrounds than other fluorescent stains.

Deep Purple gives you more volume with less noise providing up to eight times more sensitivity than SYPRO™ Ruby with no speckling.

Rapid, high sensitivity fluorescent total protein stain

- High signal-noise-ratio and no speckling means low intensity spots and bands are detected
- Excellent results with both protein gels and blots
- Very good compatibility with mass spectrometry, Edman sequencing, and Ettan DIGE system spot-picking workflow
- Environmentally friendly, free from heavy metals, allowing safe disposal after use
- Compatible with both UVA transilluminators and industry standard fluorescence scanners

Less noise with Deep Purple Total Protein Stain



2-D gels of a protein sample consisting of a mix of HBL100 breast cell line and BT474 breast cell carcinoma stained with (A) Sypro Ruby and (B) Deep Purple. For clarity, the gel images show pH 3-8 where most of the proteins are present. The expanded region of the gel stained with Sypro Ruby (gel A) and resulting 3-D plot demonstrate the drawbacks associated with "speckling". Staining with Deep Purple (gel B) eliminates speckling and improves spot clarity, which allows more accurate spot detection and protein identification. First dimension: pH 3-10 NL 24-cm Immobiline DryStrip strip run on Ettan IPGphor IEF System; second dimension: 12.5% SDS electrophoresis gel run on Ettan DALT*twelve* electrophoresis system. Scanned using Typhoon 9410 Variable Mode Imager. Full experimental details can be found at www.gehealthcare.com/deeppurple.

ImageQuant Imagers

High-performance, affordable, versatile, upgradeable imagers

ImageQuant 300
Gel documentation and fluorescence

- For quality images and prints with good resolution supporting most common applications, such as ethidium bromide (EtBr)–stained and Coomassie Blue–stained gels
- High-specification cabinet with multiple lighting options
- Upgrade to ImageQuant 400/ECL™ possible without changing cabinet
- Less risk of saturated images—10-bit A/D converter with 10-bit camera provides larger dynamic range than standard 8-bit systems

ImageQuant ECL
Chemiluminescence, gel documentation, and fluorescence

- Full 16-bit CCD delivers best specifications for chemiluminescence
- Low-noise camera and microlens technology provides the highest chemiluminescence sensitivity
- Regulated cooling to provide the best reproducibility

ImageQuant 400
Gel documentation, fluorescence, and chemiluminescence

- Covers all CCD imaging applications, with multiple standard and optional lighting choices
- Regulated, cooled CCD for lower noise, higher signal resolution, and the best reproducibility
- Extended OD option for 16–18 bit dynamic range
- Designed for the busy core lab

For more information on our complete range of imaging acquisition solutions, request the brochure *Time for a new image?—A complete range of imaging solutions*, 28-4044-77.

Image acquisition

Typhoon Variable Mode Imager

The Typhoon™ Variable Mode Imager is a highly sensitive, variable-mode gel imager, optimized to image CyDye DIGE fluorlabeled proteins in 2-D DIGE analysis using the Ettan DIGE system.

Gels are scanned between glass plates, preventing drying and shrinkage and allowing further running and rescanning, if required

Extremely low limits of detection on all of your samples means you can obtain valuable data you might normally have missed, as well as accurately quantifying very low abundance protein expression levels. Automated multicolor scanning enables detection of multiple samples in the same experiment to ensure accurate analysis and increased throughput.

The Typhoon scanner combines the ability to detect an extensive variety of fluors with proven storage phosphor autoradiography technology and direct imaging of chemiluminescence.

Typhoon features

- Outstanding linearity, quantitative accuracy and extremely low limits of detection
- Detection of small differences with highest statistical confidence
- Consistent point light illumination
- Simultaneous imaging of two large format Ettan DALT gels automatically

Ettan DIGE Imager

The newly introduced Ettan DIGE Imager is a scanning CCD camera-based instrument designed specifically for creating high resolution images of the multi-channel 2-D gels produced by Fluorescence Difference Gel Electrophoresis (DIGE) experiments.

This unimodal fluorescence imaging platform is ideal for users who want to take advantage of the benefits of DIGE technology for high resolution protein separations but do not require the throughput or breadth of applications offered by the DIGE-enabled Typhoon.

The Ettan DIGE Imager combines high sensitivity, resolution and ease of use with the ability to adopt a broad range of gel sizes for imaging. It is a cost-effective imager that can be dedicated but not limited to DIGE applications. This provides an ideal platform for fluorescent Western blotting and is a perfect partner for ECL Plex™ applications.

Fast scanning for increased throughput. Gels are mounted in cassettes to avoid gel drying.

Ettan DIGE Imager features

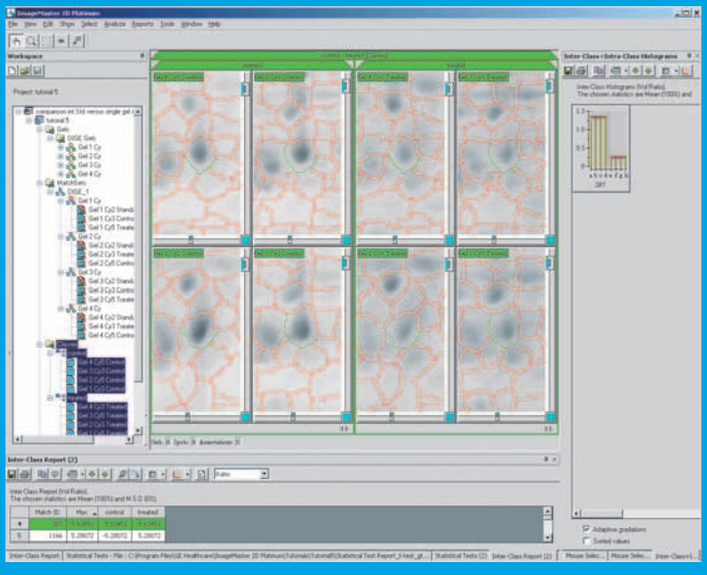
- High sensitivity for imaging faint spots
- Software-selectable wavelengths for better sensitivity and reduced background
- Adjustable scan time to optimize sensitivity
- Sealed environment for scanning and protecting wet samples

For more information on our complete range of imaging acquisition solutions, request the brochure *Time for a new image?—A complete range of imaging solutions*, 28-4044-77.

ImageMaster 2D Platinum

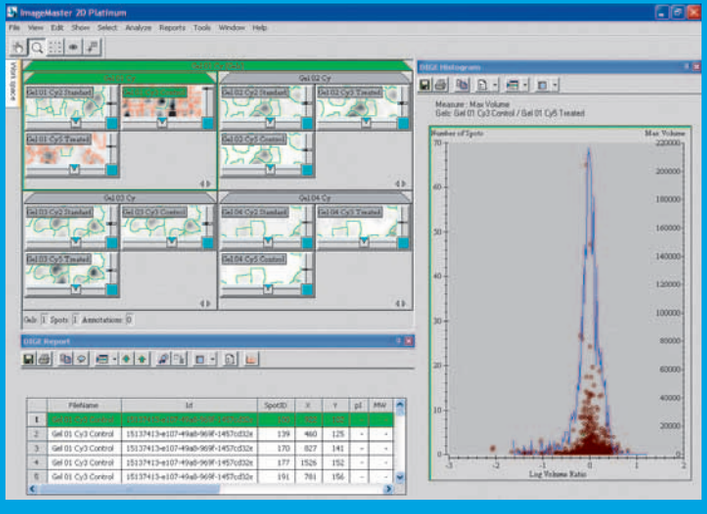
The fast route to protein visualization

ImageMaster 2D Platinum and ImageMaster 2D Platinum DIGE image analysis software now provide a common interface and workflow for both non-DIGE and DIGE analysis. ImageMaster 2D Platinum substantially shortens the path from data to protein information. This allows you to validate significant results directly, without having to spend valuable time on data extraction.



Analyze

- Outstanding spot detection and filtering
- Extended matching capability
- Advanced statistical identification of protein expression changes
- Unrivaled annotation capability with link to Internet query engines
- Now enabled to exploit the benefits of Ettan DIGE (2-D Difference Gel Electrophoresis) using pre-labeled, multiplexed samples and the internal standard
- Automatic simultaneous handling of large numbers of 2-D gels



Visualize

- Comprehensive data presentation using numerous tabular and graphic formats
- Simultaneous 3-D views of multiple gels
- Intelligent multi-worksheet display

Organize

- Gels and experiments in workspaces
- Personalized work environment for each user
- Data collated in projects, classes, and subsets for specific reporting

For more information on our complete range of imaging analysis solutions, request the brochure *Time for a new image?—A complete range of imaging solutions*, 28-4044-77.

DeCyder 2-D Differential Analysis Software and Extended Data Analysis

Comparative analysis made simple

DeCyder 2-D Differential Analysis Software is specifically developed to exploit the benefits of prelabeled, multiplexed samples using the internal standard in Ettan DIGE system.

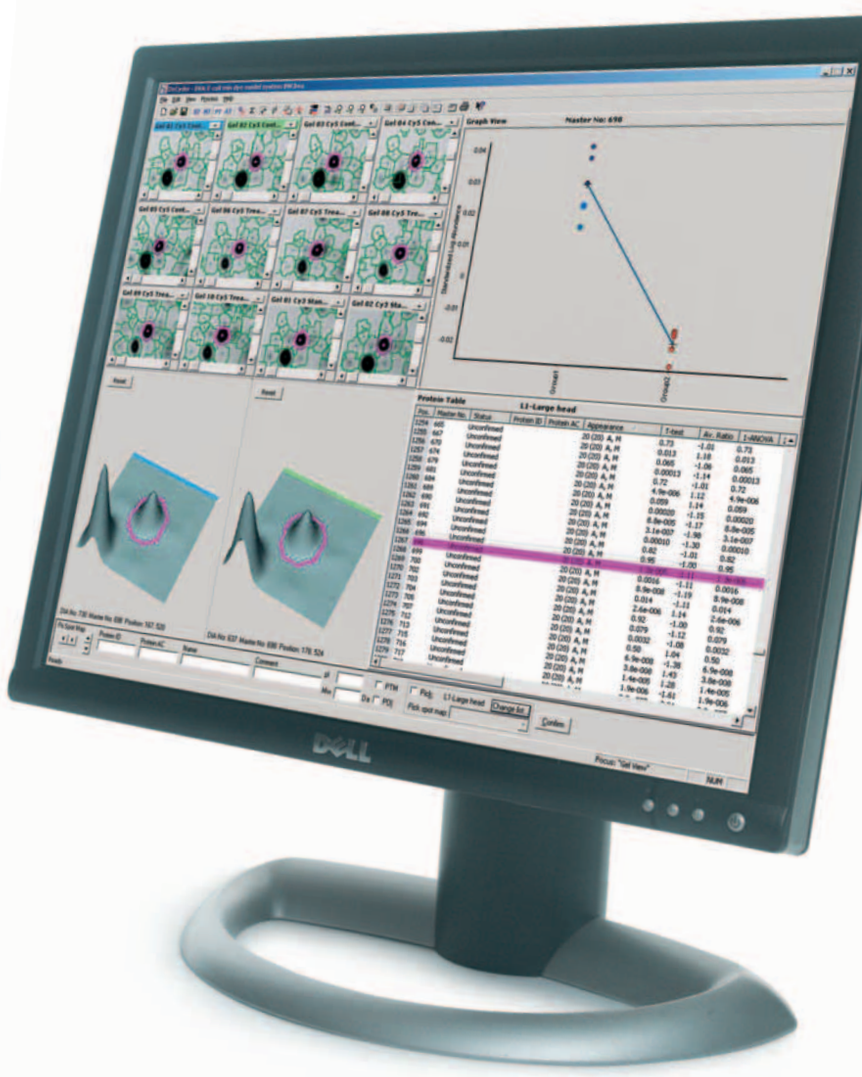
DeCyder software brings statistical confidence and minimal user-to-user variation, reducing hands-on analysis time to minutes.

- Provides detection of less than 10% differences between spots with 95% statistical confidence
- No spot matching within gels, eliminating matching errors
- Designed to make use of an internal standard, which increases accuracy and simplifies gel-to-gel matching

DeCyder Extended Data Analysis is a powerful, 2-D DIGE software solution that offers advanced statistical analysis in an easy-to-use format.

DeCyder EDA employs multivariate analysis and sophisticated clustering methods to uncover patterns in protein expression data derived from 2-D DIGE experiments. The software employs a “data set” as the basis for 2-D gel analysis. Defined as a group of spot maps with matched protein spots, each data set can be displayed in different ways depending on the goals of the experiment.

This new analytical tool contributes to a better understanding of regulatory pathways. It also helps proteomics researchers identify proteins that can discriminate between healthy and diseased tissue samples and different disease states and tumor types more rapidly and accurately.



Results you can trust

"Without the benefit of the internal standard, 42 of these proteins would have been overlooked due to variation between normal and tumor samples ... compared with individual DIGE comparisons made within a single 2-D gel."

Friedman, D. B. *et al.* Proteome analysis of human colon cancer by two-dimensional difference gel electrophoresis and mass spectrometry. *Proteomics* **4**, 793–811 (2004).

"Ettan DIGE with the internal standard delivers reliable results by decreasing gel-to-gel variation more than ever before."

Dr Jörgen Östling, AstraZeneca R&D, Mölndal, Sweden

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imagination at work

Elanders Österväla 2007

28-4034-38 AB 07/2007