HPE

HIGH PERFORMANCE ELECTROPHORESIS

The new horizon in Gel Electrophoresis

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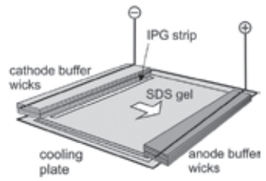
Horizontal electrophoresis principle

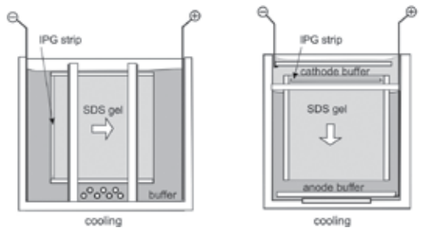
Horizontal Systems
In a horizontal flatbed system the gel is run on a cooling plate with an open surface. For large gels the required total buffer volume is 160 mL per gel, for standard size gels 40 mL per gel. This is applied in buffer wicks, which are placed on the gel edges. The gel is thinner (0.65 mm) and polymerized on a thin film support. Therefore the cooling is highly efficient, which enables a higher electric field strength, shortening the electrophoresis time. This, combined with thin gel layers, result in higher resolution and sharper bands or spots, increasing the sensitivity of detection. Therefore more proteins can be detected.

For one-dimensional electrophoresis, the gels contain wells in the surface for application of the liquid samples. For two-dimensional electrophoresis, there are long slots on the surface of the gel to hold the IPG strips of the first dimension run: from 7 up to 24 cm length, and one well for application of the molecular weight standard proteins.



The new flatbed system introduces true High Performance Electrophoresis into the world of electrophoresis: HPE

Vertical Systems
In the vertical 2D electrophoresis setup, the polyacrylamide gel is run in glass cassettes, placed in buffer chambers with buffer volumes from 7 to 25 L, irrespective of whether one gel or twelve gels are being run. For 2D electrophoresis the gel must be at least 1 mm thick in order to accommodate the IPG strip, which has a thickness of almost 1 mm after equilibration. Cooling occurs indirectly from a heat exchanger via the buffer and then the glass plates. The glass cassettes can be re-used only after thoroughly cleaning.



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What is HPE?

The HPE FlatTop tower and the HPE gels have been developed together as a system, in order to achieve better results than can be obtained with conventional SDS polyacrylamide gel electrophoresis (PAGE) technology.

The breakthrough technology of HPE means:

- HPE gels are 650 µm thick - optimised for efficient cooling and staining, without showing overloading effects for highly abundant proteins. To ensure complete transfer of proteins from the first into the second dimension gel, the composition of the polyacrylamide matrix of the 2D HPE gels is modified and allows the application of the IPG strip in a sample trench.
- Efficient temperature control in the HPE tower – precise production of HPE gel polymerisation guarantees highly reliable gels and reproducible results
- Shelf-life of the HPE gels is one year, and remain stable during the storage period. A buffer system based on Tris-tricine-SDS - storage pH value of the gel buffer is 6.9, preventing alkaline hydrolysis. During electrophoresis the pH value in the gel raises to pH 8.5 for fast migration of the zones. The tricine in the buffer allows separation reaching below 8 kDa in HPE gels, unlike the 10 kDa in standard Laemmli gels.
- The buffer concentrates are ready to use. The equilibration buffer is provided with the HPE gels - therefore less variables than conventional electrophoresis and quick to use
- All state-of-the art fluorescent detection (including DIGE) can be applied using HPE gels polymerised on non-fluorescent film-backing (NF). The HPE tower protects gels from light during the run
- Two runs per day - short set-up and fast running time
- HPE 2D gel shows an average 15 % more protein spots than conventional 2D gel
- No large buffer volumes – no time wasted cleaning glass plates and buffer chambers
- An environmentally friendly process - no need to handle acrylamide monomer and no contaminated fluid waste to dispose of
- Film-backed gels do not swell or shrink during staining. Automated spot picking is easier from a film-backed HPE gel than form conventional slab gels or gels on glass plates. Fluorescent stained gels can be post-stained with visible dyes for manual spot picking
- The higher protein concentration in the spots of an HPE gel also improves the yield of tryptic digested peptides because of the higher protein-to-polyacrylamide gel ratio

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The new multi-level electrophoresis system for up to four high resolution 1D and 2D separations in flatbed gels!

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FlatTop Tower

Easy to Use

The HPE FlatTop Tower allows electrophoretical separations in up to 4 horizontal flatbed gels at the same time. It is used for 1D and 2D electrophoresis gels, where multiple runs are an important demand.

Structurally, the HPE FlatTop Tower consists of four horizontal electrophoresis chambers, which are built as movable drawers into a metal housing. The pre-cast HPE gels, which are less than 1 mm thin and film-backed, are protected from light during the run. No glass plates are used. They are placed on aluminum oxide ceramics cooling plates, which ensures very efficient heat dissipation and therefore straight electrophoretic migration in each gel.

The HPE tower also has an inbuilt pump for optimum cooling water flow through the plates. The system does not need buffer chambers because paper wicks are soaked with concentrated electrophoresis buffers, and placed between the gel edges and the electrode wires, which are mounted into the lids. The electrode positions are adjustable to the two different gel sizes.

A sophisticated electronic sensor system delivers information about the electric field distribution between the HPE gels, and indicates which drawer-chambers are in use. The HPE tower is run with an external power supply and a thermostatic circulator (chiller).

FlatTop Tower technical details	
Size:	about 50 x 50 x50 cm
Weight:	about 65 kg
Four electrophoresis chambers as drawers	
The cooling plates are made of aluminum oxide ceramics	
Electrodes are adjustable for standard size and large gels.	
Rated up to 1500 V	
CE marked	

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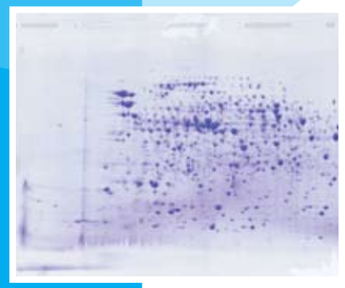
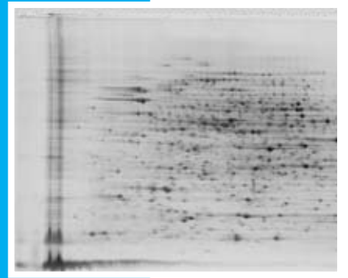
2D Gels





The HPE flatbed gels are available in two different sizes:

Standard size (26 x 12 cm)
1D SDS or native electrophoresis with 25, 52, and 103 sample wells
2D electrophoresis with 2 x 11 cm IPG strips and 1 marker lane

Large size (26 x 20 cm)
2D electrophoresis with one 24 cm IPG strip and 1 marker lane.

There is a choice between a standard film-backing for visible staining methods, and a 'NF' (Non-Fluorescent) film-backing material, which does not give any fluorescent background when using fluorescent detection methods.

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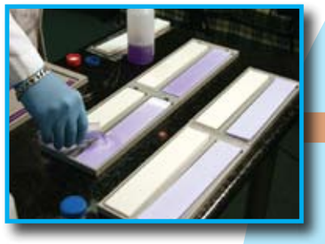
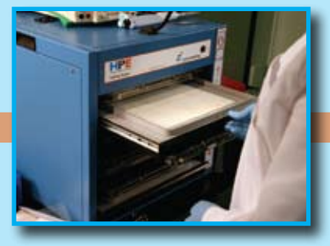
The Process

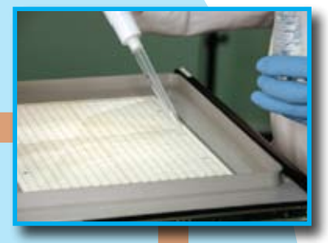


Soaking the filter paper wicks with electrode buffer. The anodal solution is color coded blue

Equilibration of the IPG strips with the provided equilibration buffer, only urea, DTT, and iodoacetamide need to be added.



Pull open the draw



Application of a few mL cooling contact fluid

.....and cathode....

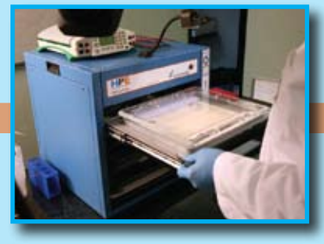
Placing the electrode wicks on the gel edges.....anode....

Placing the gel on the cooling plate

Preparing the gel for placement

Anode at the top, cathode at the bottom

Placing the IPG strip gel-side down in the long slot



After electrophoresis remove the gel for direct scanning (DIGE) or post-staining

Clean the cooling plate by simply wiping off the cooling fluid and remains of the buffers

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A simple process is repeated for each draw

No agarose embedding

No glass plates needed

Easy handling, very versatile

Less cleaning - low buffer volumes

Fast to stain - 0.65mm thin gels

Very high sensitivity (sharper spots)

Higher peptide yield in tryptic digestion

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What it all means

Features	Benefits
Industrially produced, high volume batch casted, quality controlled	High gel to gel reproducibility • very low scrapping rate • less gel repeats required
Plastic backed gel carrying individual identification number	Easy to handle • no cracking • gel easy to trace due to individual ID number printed on the gel • can be stored in the freezer • spots can be picked from the gel even one month after the electrophoresis run • gels can be filed in standard office file folders • no glass cassettes • no time consuming glass plate cleaning
Thin gel, just 650µm thick	Faster separation • sharper spots/bands • better separation – up to 15% more spots
Alumina ceramic cooling plate in FlatTop Tower	Higher power applied • higher field strength – leads to better separation
Fluorescent free plastic backing	Low noise signal obtained from scanning • gel surface scanned directly on the plattern • no glass cassette
Buffer concentrate in paper wicks for gel running	Just a small paper stack to remove from the gel after running • no handling of litres of buffer required
Pre-cast gels	No toxic monomers to handle • no environmental and work environment objections

"Finally, after so many years, this new electrophoresis system represents the best of the two electrophoresis "worlds". The speed, separation performance and ease of handling that horizontal electrophoresis always accomplished with the multiple gel running and quantitative transfer from the first to the second gel dimension of the vertical gel technology.

I'm sure this will open new opportunities for 2D gel electrophoresis. This development means a big step forward in electrophoresis and represents the most innovative new system and a unique new gel chemistry."

Angelika Görg

gelcompany has now enabled the future of electrophoresis to be more accurate, consistent, easy to use and cost efficient, while ensuring the development of the science of the detection of proteins continues to bring about welcome changes in the worlds of healthcare and research.

Welcome to the future of electrophoresis:

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Product Range

Electrophoresis Systems	Pack Size	Cat. No.
FlatTop tower for horizontal electrophoresis	1	1111-01
FlatTop large for horizontal electrophoresis	1	1100-02

Proteomics Flatbed Kits Proteomics flatbed gels on standard gel support for classical Coomassie and Silver Staining		
2DGel flatbed 12.5%	5	1009-12
2DGel flatbed 10 - 15%	5	1009-13
2DGel flatbed 10 - 15%	5	1009-16
2DGel flatbed 10 - 15%	5	1009-17

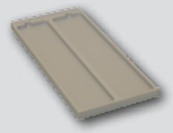
Proteomics Flatbed Kits NF Proteomics flatbed gels on non-fluorescent gel support for fluorescent staining and DIGE		
2DGel flatbed NF 12.5%	5	1009-02
2DGel flatbed NF 10 - 15%	5	1009-03
2DGel flatbed NF 15%	5	1009-04
2DGel flatbed NF 12.5% Large	5	1009-06
2DGel flatbed NF 10 - 15% Large	5	1009-07

Buffer Packs for Flatbed Gels		
Buffers and wicks 2DGel flatbed	1	1019-19
Buffers and wicks 2DGel flatbed Large	1	1019-20

ID SDS Page Kit		
SDS Gel kit 10% 25S	5	1021-01
SDS Gel kit 10% 52S	5	1021-02
SDS Gel kit 15% 25S	5	1021-03
SDS Gel kit 15% 52S	5	1021-04
1DS Gel kit flatbed NF 12.5%	5	1021-23
1DS Gel kit flatbed NF 15%	5	1021-24

Protein Gel Stains	Pack Size	Cat. No.
LavaPurple		
LavaPurple 5 ml fluorescent protein stain kit	5 ml	LP011005
LavaPurple 25 ml fluorescent protein stain kit	25 ml	LP011025
LavaPurple 100 ml fluorescent protein stain kit	100 ml	LP011100
LavaPurple 5 ml fluorescent protein stain	5 ml	LP012005
LavaPurple 25 ml fluorescent protein stain	25 ml	LP012025
LavaPurple 100 ml fluorescent protein stain	100 ml	LP012100
LavaPurple 5 ml buffer pack	5 ml	BP011005
LavaPurple 25 ml buffer pack	25 ml	BP011025
LavaPurple 100 ml buffer pack	100 ml	BP011100
LavaBlue		
LavaBlue 1 ml fluorescent protein stain	1 ml	LB011001
LavaBlue 5 ml fluorescent protein stain	5 ml	LB011005

Cell Imaging Stain		
LavaCell		
LavaCell 200 µl fluorescent live cell imaging stain	200 µl	LC011001
LavaCell 1 ml fluorescent live cell imaging stain	1ml	LC011002
Quantification Kits		
LavaPep fluorescent protein and peptide quantification kit	1	LP022010
LavaDigest Fluorescent proteolytic digestion monitoring kit	1	LP031020



Electrophoresis Accessories		
PaperPool	1	1003-03
CleanPool	1	1003-20
IPG-Strip pusher	1	1003-55
Steel tray + grid + lid	1	1003-25
Steel tray large + grid + lid tray	1	1003-26
IPG-Strip pool	1	1003-04

Tower Accessory Kit		
Pipette, scissors, tweezers, PaperPool	1	PGT-001-TK

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The Tuebingen, Germany based gelcompany team that developed the new HPE electrophoresis system and produces the new HPE gels for 1 and 2D electrophoresis. It includes electrophoresis experts such as Reiner Westermeier, Philippe Bogard, Hanspeter Schickle and Guenter Thesseling, who together have many decades of experience in the electrophoresis world.

gelcompany develops, manufactures and supplies innovative consumables and accessories for Proteomics, Genomics and Cell Biology to scientists around the world. We provide products with superior performance that are simple and safe to use and that are environmentally friendly.

gelcompany brings together into one organisation: Fluorotechnics (Sydney) - fluorescence-based consumables; ETC Elektrophorese-Technik GmbH (Germany) - high-end electrophoresis pre-cast gels, consumables and equipment; The Gel Company (San Fransisco) - cell culture, DNA sequencing, proteomics and microarray consumables and equipment.

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