

Product survey: Two-dimensional electrophoresis

# 2-DE Enters New Dimensions

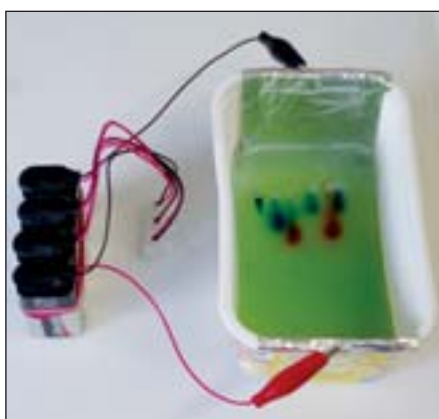
Though Patrick O'Farrell and Joachim Klose independently introduced Two-Dimensional Electrophoresis (2-DE) as early as 1975, it took more than two decades before 2-DE became one of the most popular protein separation techniques.

Only a few labs focused on 2-DE in the pre-proteomics era, probably because of its reputation as being rather irreproducible. Especially 2-DE's first dimension, which is done by isoelectric focusing (IE), was peppered with pitfalls. Until the advent of immobilised pH gradient (IPG) strips, the isoelectric focusing step was carried out in polyacrylamide gel rods that were formed in glass tubes. To establish a pH gradient in the gel, ampholytes were poured into the tubes together with the polyacrylamide solution. These polyacrylamide rods, however, had two major disadvantages. Firstly, the pH gradients were hard to reproduce and tended to drift towards the cathode during the IF, leading to a loss of basic proteins having higher isoelectrical points (pI). Secondly, they were extremely fragile. It's a fair guess that the hardest part for most people doing 2-DE in the early days, was to get the gel rod out of the glass tube and lay it on top of a PAGE slab gel that serves as second dimension – without breaking it into pieces.

## 2-DE breakthrough

Fiddling around with breakable gel rods came to an end when, in 1982, Bengt Bjellquist *et al.* presented an IEF procedure based on Angelika Görg's (then a PhD student at the TU Munich) idea of using immobilised pH gradients (IPGs) on plastic backings. To establish fixed pH gradients, Bjellquist and his colleagues mixed carrier ampholytes attached to acrylamide molecules (immobilines) with an acrylamid solution and poured the mixture into a polymerisation cassette, made of two glass plates (one of them covered with a polyester film on the inside) and a thin spacer. The resulting gradient gel, which they cut into three millimetre wide stripes before placing them into the isoelectric focusing chamber, eliminates one of the major problems of carrier ampholytes: the pH gradient on the strip is almost set in stone and does not move, even if the IEF rests for hours.

Over the years, Angelika Görg's proteomic group at the TU Munich has constantly improved the IPG strips; today, they are applied by almost all proteomic labs per-



**36V instead of 12,000V: flatbed electrophoresis chamber made from a margarine tub and connected to 9V batteries.**

forming two-dimensional electrophoresis.

Isoelectric focusing devices for 2-DE are designed to work with commercial or homemade IPG strips, accordingly. In some cases, up to 12 strips can be assembled in parallel and focused applying extremely high voltages. To keep focusing times as short as possible and optimise focusing results, the voltage output of IEF power supplies may be raised to 12,000V, which is indeed extraordinarily high and equals the tension produced by power plant generators. The resulting high voltage electric field vigorously pulls the charged proteins along the IPG strips, thereby producing a lot of thermal energy. Hence, cooling is an issue for any IEF device. To prevent overheating of proteins during focusing, IPG strips are usually placed on a peltier cooling plate and the power supply is set to constant power mode.

## Modular systems

Though some manufacturers offer integrated systems comprised of IEF and slab gel units adjusted to each other, the second dimension of 2-DE can be done in any vertical or horizontal slab gel fitting the size of the preferred IPG strips. Most of today's vertical slab gel chambers are equipped with external peltier cooling systems as well as internal buffer circulation pumps and may be loaded with up to six slab gels that can be run in parallel. A noticeably large number of

gel chambers come in a rather chic and coloured design – it seems that the days of assembling gel cassettes and tanks with rusty clamps and running gels in boxy, ugly, gray gel chambers without lids are definitively over.

IEF units and gel chambers designed for classical 2-DE may also be instrumental in Two-Dimensional Differential In-Gel Electrophoresis (2D-DIGE). 2D-DIGE, developed in Jonathan Minden's Lab at the Carnegie Mellon University (Pittsburgh, USA) in the late 1990's, allows the identification of protein changes between three different samples, e.g. healthy, diseased and internal control, in one 2-DE. To this end, proteins extracted from the three samples are labelled, each with one of three, size and charge matched, fluorescent dyes having different excitation and emission wavelengths. Equal concentrations of the differently labelled protein samples are applied to a gel plate and separated by 2-DE. The gel is then scanned with a fluorescence imager to visualise differences in protein expression levels. Since the complete DIGE gel cassette is often placed onto the image plate, DIGE gels are cast in cassettes formed by low fluorescence glass plates.

## Old but not outdated

Although most labs favour IPG strips, gel rods are still in use in non-equilibrium pH gradient electrophoresis (NEPHGE), which is also attributed to Patrick O'Farrell and Joachim Klose. The first dimension of NEPHGE differs in two crucial points from the classic 2-DE. The protein probes are loaded on the acid site of the gel rod and the voltage-time product applied during isoelectric focusing is usually lower. Due to this slight variation, a non-equilibrium pH gradient is established in the gel that allows separation of proteins, which are often poorly processed by IPG strips, e.g. basic proteins, membrane proteins and very big proteins. Equipment for the first and second dimensions of NEPHGE is basically the same as for classic 2-DE, however, gadgetry tailored especially for NEPHGE is rather expensive.

HARALD ZÄHRINGER

## 2D Electrophoresis Systems

Company	Name of product	Short description	Gel format/ Number of gels per run?	Miscellaneous, Specialities, Generally	Price [EUR]
<b>Bio-Rad Laboratories</b> Munich, Germany www.bio-rad.com <b>Contact:</b> Phone: +49(0)89 31 884-177 TechSupport.LSG.CE@ bio-rad.com	PROTEAN IEF System	High-capacity running platform for isoelectric focussing of IPG strips	<ul style="list-style-type: none"> <li>■ Up to twentyfour 7 cm strips</li> <li>■ Up to twelve 11, 17, 18, or 24 cm strips</li> <li>■ Broad, narrow and micro pH ranges available</li> </ul>	<ul style="list-style-type: none"> <li>■ Optional cup loading</li> </ul>	6.825,-
	MicroRotor Cell	Liquid based IEF device for sample pre eparation	<ul style="list-style-type: none"> <li>■ 10 fractions per sample</li> <li>■ Micro to milligram protein load</li> <li>■ Customizable pH gradient</li> </ul>	<ul style="list-style-type: none"> <li>■ Integrated temperature control</li> </ul>	3.710,-
	Mini-PROTEAN Tetra Cell	Small format, vertical electrophoresis system for 2nd dimension	<ul style="list-style-type: none"> <li>■ Up to 4 gels</li> <li>■ 8.6 x 6.8 cm (precast)</li> <li>■ 8.3 x 7.3 cm (handcast)</li> <li>■ &lt;1h per run</li> </ul>	<ul style="list-style-type: none"> <li>■ 1-D and 2-D applications</li> <li>■ Error-free operation</li> <li>■ No current leakage</li> </ul>	635,- to 1.065,-
	Mini-PROTEAN 3 Dodeca Cell	High-throughput, small format, vertical electrophoresis system for 2nd dimension	<ul style="list-style-type: none"> <li>■ Up to 12 gels</li> <li>■ 8.6 x 6.8 cm (precast)</li> <li>■ 8.3 x 7.3 cm (handcast)</li> <li>■ &lt;1h per run</li> </ul>	<ul style="list-style-type: none"> <li>■ Built-in cooling coil</li> <li>■ Stirbar capability</li> <li>■ Optional external refrigerated circulator</li> <li>■ 1-D and 2-D applications</li> </ul>	3.190,-
	Criterion Cell	Midi format, vertical electrophoresis system for 2nd dimension	<ul style="list-style-type: none"> <li>■ Up to 2 gels</li> <li>■ 13.3 x 8.7 cm (precast)</li> <li>■ &lt;1h per run</li> </ul>	<ul style="list-style-type: none"> <li>■ Leakage free, integrated upper buffer chamber</li> <li>■ Built-in wedge on the lid to open cassette</li> <li>■ 1-D and 2-D applications</li> </ul>	515,-
	Criterion Dodeca Cell	High-throughput, midi format, vertical electrophoresis system for 2nd dimension	<ul style="list-style-type: none"> <li>■ Up to 12 gels</li> <li>■ 13.3 x 8.7 cm (precast)</li> <li>■ &lt;1h per run</li> </ul>	<ul style="list-style-type: none"> <li>■ Built-in cooling coil</li> <li>■ Optional external refrigerated circulator</li> <li>■ 1-D and 2-D applications</li> </ul>	3.320,-
	PROTEAN II XL Cell	Large format, vertical electrophoresis system for 2nd dimension	<ul style="list-style-type: none"> <li>■ Up to 4 gels</li> <li>■ 18.3 x 19.3 cm (precast)</li> <li>■ 18.3 x 20 cm (handcast)</li> </ul>	<ul style="list-style-type: none"> <li>■ Central cooling core</li> <li>■ Optional external refrigerated circulator</li> <li>■ 1-D and 2-D applications</li> </ul>	1.905,-
	PROTEAN II XL Multi Cell	Medium-throughput, large format, vertical electrophoresis system for 2nd dimension	<ul style="list-style-type: none"> <li>■ Up to 6 gels</li> <li>■ 18.3 x 19.3 cm (precast)</li> <li>■ 18.3 x 20 cm (handcast)</li> </ul>	<ul style="list-style-type: none"> <li>■ 2 cooling coils and 3 cooling cores</li> <li>■ Optional external refrigerated circulator</li> <li>■ 1-D and 2-D applications</li> </ul>	5.245,-
	PROTEAN Plus Dodeca Cell	High-throughput, large format, vertical electrophoresis system for 2nd dimension	<ul style="list-style-type: none"> <li>■ Up to 12 gels</li> <li>■ 18.3 x 19.2 cm</li> <li>■ 18.5 x 20 cm</li> <li>■ 20 x 20.5 cm</li> <li>■ 25 x 20.5 cm</li> <li>■ 25.6 x 23 cm</li> <li>■ Hinged spacer plates</li> </ul>	<ul style="list-style-type: none"> <li>■ Ceramic cooling core</li> <li>■ Buffer circulation pump</li> <li>■ Plate electrodes</li> <li>■ Optional external refrigerated circulator</li> </ul>	9.100,-
	Criterion Stain Free System	Combination of pre-cast gels, imager, and software to enable direct visualization of proteins after SDS-PAGE without any pre- or post staining steps	<ul style="list-style-type: none"> <li>■ Criterion gel format (1-12 gels per run)</li> <li>■ 13.3 x 8.7 cm (precast)</li> <li>■ &lt;1h to run and visualize</li> </ul>	<ul style="list-style-type: none"> <li>■ 1-D and 2-D applications</li> <li>■ Increased reproducibility</li> <li>■ Reduced organic waste</li> <li>■ One-touch gel image processing</li> </ul>	On request
Dodeca Stainers	High-troughput staining device for colorimetric and fluorescence stains	<ul style="list-style-type: none"> <li>■ Up to 24 Criterion gels</li> <li>■ Up to 12 PROTEAN II XL or PROTEAN Plus gels</li> </ul>	<ul style="list-style-type: none"> <li>■ Built-in shaker motor</li> </ul>	3.685,-	
<b>Biostep</b> Jahnsdorf, Germany www.biostep.de <b>Contact:</b> Silvana Böhme Phone: +49(0)3721-3905-24 s.boehme@biostep.de	Horizon Plus System HPTV-SY	Complete 2D electrophoresis system for running reproducible 2D gels, consisting of flatbed isoelectric focusing system for 1st dimension and a vertical unit for SDS-PAGE	1st dimension: <ul style="list-style-type: none"> <li>■ 30 IPG strips, 70 x 3 x 1 mm to 240 x 3 x 1 mm</li> <li>■ 1 IEF gel 245 x 125mm</li> <li>■ 2 IEF gels 125 x 125mm</li> </ul> 2nd dimension: <ul style="list-style-type: none"> <li>■ 8 x 8.5 cm / 16.5 x 17.5 cm</li> <li>■ 2 x 7 cm / 2 x 18 cm IPG strips</li> </ul>	1st dimension: <ul style="list-style-type: none"> <li>■ Flexible system for applications up to 1,500V</li> <li>■ Ceramic cooling plate for connection to a chiller in order to maintain IEF at 4 or 20°C</li> <li>■ Adjustable electrodes</li> </ul> 2nd dimension: <ul style="list-style-type: none"> <li>■ Vertical units available in different sizes</li> </ul>	From 1.923,-
	PowerScan 900 / 1100	Documentation system for colorimetrically marked gels with high quality optics for scanning	<ul style="list-style-type: none"> <li>■ Max. scan size 203 x 254 mm (PowerScan 900) or 309 x 420 mm (PowerScan 1100)</li> </ul>	<ul style="list-style-type: none"> <li>■ For moist gels</li> <li>■ Incl. greyscale wedge for calibration</li> <li>■ Optical resolution 50 to 2400/4800 dpi</li> <li>■ Spectral range 420 to 745 nm</li> <li>■ Dynamic range 65.536 greyscales (16 Bit); 281,5E12 colours (48 Bit)</li> </ul>	From 2.095,-
	MF-ChemiBIS 3.2	Documentation system for fluorescence and chemiluminescence 2D gels with up to 8 excitation wavelengths	<ul style="list-style-type: none"> <li>■ Max. scan size 260 x 190 mm</li> </ul>	<ul style="list-style-type: none"> <li>■ 2184 x 1472 pixel (3.2 Mp)</li> <li>■ Excitation wavelengths 254 to 620 nm</li> <li>■ Exposure time 30min to 24 hrs</li> <li>■ Dynamic range 65.536 greyscales (16 Bit)</li> <li>■ Liquid-cooled CCD camera (-65°C)</li> </ul>	From 37.950,-

## 2D Electrophoresis Systems

Company	Name of product	Short description	Gel format/ Number of gels per run?	Miscellaneous, Specialities, Generally	Price [EUR]
<b>Carl Roth</b> Karlsruhe, Germany www.carlroth.com <b>Contact:</b> Stefanie Seipp, Phone: +49(0)721/56061038 s.seipp@carlroth.de	Flat Bed Electro-phoresis Unit MULTI	Coolable unit for isoelectric focusing and for all flat bed gels	<ul style="list-style-type: none"> <li>■ Max. 25 x 25 cm</li> <li>■ For 1-30 x 3 mm IPG strips</li> <li>■ For 1-10 flat bed gels</li> </ul>	<ul style="list-style-type: none"> <li>■ For IPG strips and flat bed gels</li> <li>■ Coolable gel platform</li> <li>■ Variable applications using adjustable or tank mounted electrodes</li> <li>■ Accessories can be bought separately</li> </ul>	1286,- (Please ask for a quotation)
	Capillary Running Module	Insert for Vertical Double Electrophoresis Units MINI and MAXI	<ul style="list-style-type: none"> <li>■ For capillaries of 8 cm (MINI) and 17 cm (MAXI) length in maximum</li> <li>■ For 1-10 capillaries</li> </ul>	<ul style="list-style-type: none"> <li>■ Flexible application with 1-10 gels in parallel</li> <li>■ Very user-friendly</li> <li>■ Well-priced module for the vertical electrophoresis unit</li> <li>■ Accessories like glass capillaries and gel extraction platforms can be bought separately</li> </ul>	399,- (MINI) 656,- (MAXI) (Please ask for a quotation)
	Vertical Double-Electrophoresis Units	Vertical electrophoresis units for 2nd dimension gels (self-made or ready-made)	<ul style="list-style-type: none"> <li>■ MINI: 8-10 x 10 cm</li> <li>■ MAXI: 20 x 20 cm</li> <li>■ 2 gels in maximum</li> </ul>	<ul style="list-style-type: none"> <li>■ Flexible use for 1 or 2 gels in parallel</li> <li>■ Very user-friendly design</li> <li>■ Including accessories for 2 gels and gel pouring device</li> <li>■ Compatible with all standard ready-made gels</li> <li>■ Available as uncooled or coolable version</li> </ul>	699,- (MINI) 888,- (MINI coolable) 1075,- (MAXI) 1185,- (MAXI coolable) (Please ask for a quotation)
<b>Fujifilm Europe</b> Düsseldorf, Germany www.fujifilm.eu <b>Contact:</b> Dietmar Struss dietmar_struss@fujifilm.eu	FLA-9000	Laserscanner for fluorescent and radioisotopic imaging of 2D gels and blots	<ul style="list-style-type: none"> <li>■ Max scanning area is 40x46cm</li> </ul>	<ul style="list-style-type: none"> <li>■ Five different lasers covering from 470 nm to 780 nm</li> <li>■ Five resolution levels</li> <li>■ Free choice of emission filters Qdot-application, silverstained and CBB-Gels</li> <li>■ Easy customising</li> </ul>	Starting from 50.000,- (Depending on configuration)
	FLA-7000	Laserscanner for fluorescent and radioisotopic imaging of 2D gels and blots	<ul style="list-style-type: none"> <li>■ Max scanning area is 24 x 40cm</li> </ul>	<ul style="list-style-type: none"> <li>■ Four different lasers covering from 470 to 670 nm</li> <li>■ Four resolution levels</li> <li>■ Free choice of emission filters Qdot-application, silverstained and CBB-Gels</li> <li>■ Easy customising</li> </ul>	Starting from 35.000,- (Depending on configuration)
<b>GE Healthcare Life Sciences</b> Uppsala, Sweden www.gelifesciences.com <b>Contact:</b> Rita Marouga Phone: +(46)186121578 rita.marouga@ge.com	Ettan IPGPhor 3 isoelectric focusing unit	High throughput first dimension electrophoresis system	<ul style="list-style-type: none"> <li>■ 7,11, 13, 18 or 24 cm IPG strips</li> <li>■ 12 strips/run</li> </ul>	<ul style="list-style-type: none"> <li>■ Fully integrated system</li> <li>■ Software controls up to four units simultaneously</li> <li>■ Lid design allows optimum running with light sensitive protein samples</li> </ul>	7925,-
	IPGbox	Rehydrate up to 12 IPG strips at one time	<ul style="list-style-type: none"> <li>■ 7,11, 13, 18 or 24 cm IPG strips</li> <li>■ 12 strips</li> </ul>	<ul style="list-style-type: none"> <li>■ Oil-free rehydration</li> <li>■ Improved quality of results</li> </ul>	245,-
	Ettan DALTsix	Second dimension vertical electrophoresis system	<ul style="list-style-type: none"> <li>■ 26 x 20 cm6 gels/run</li> <li>■ homecast or precast gels</li> </ul>	<ul style="list-style-type: none"> <li>■ High resolution and reproducibility of 2D gels</li> <li>■ Modular system for large format and medium throughput 2-D electrophoresis</li> </ul>	4505,-
	MultiTemp IV	Thermostatic circulator	NA	<ul style="list-style-type: none"> <li>■ Improved cooling and heating performance</li> <li>■ CFC free refrigerant protects the environment</li> </ul>	3660,-
	Ettan DALTwelve	High throughput second dimension vertical electrophoresis system	<ul style="list-style-type: none"> <li>■ 26 x 20 cm</li> <li>■ 12 gels/run</li> <li>■ homecast or precast gels</li> </ul>	<ul style="list-style-type: none"> <li>■ High resolution and reproducibility of 2D gels</li> <li>■ Modular system for large format and high throughput 2-D electrophoresis</li> </ul>	15800,-
	DALT gel 12.5 and DALT buffer kit	Precast homogenous gels 12.5%	<ul style="list-style-type: none"> <li>■ 26 x 20 cm</li> <li>■ Buffers sufficient for 12 gels</li> </ul>	<ul style="list-style-type: none"> <li>■ Long shelf life (12 months)</li> </ul>	410,- (6 gels) 99,- (buffer kit)
	DIGE gel and DIGE buffer kit	Precast low- fluorescence homogenous gels 12.5%	<ul style="list-style-type: none"> <li>■ 26 x 20 cm</li> <li>■ Buffers sufficient for 12 gels</li> </ul>	<ul style="list-style-type: none"> <li>■ Long shelf life (12 months)</li> <li>■ Improved resolution</li> </ul>	314,- (3 gels) 153,- (buffer kit)
	Multiphor II	Complete horizontal system for 1D, 2D electrophoresis and DNA fragment analysis	<ul style="list-style-type: none"> <li>■ 26 x 20 cm</li> <li>■ 2 x 1D gels/run</li> <li>■ 1 x 2D gel/run</li> </ul>	<ul style="list-style-type: none"> <li>■ Eliminates the need for large volumes of liquid buffer</li> </ul>	2530,-
	SE600 Ruby	Complete vertical system for 1D, 2D electrophoresis and DNA fragment analysis	<ul style="list-style-type: none"> <li>■ 18 x 16 cm</li> <li>■ 2 x 2D gels/run</li> </ul>	<ul style="list-style-type: none"> <li>■ Medium resolution and low-throughput 2D electrophoresis</li> </ul>	1830,-
	Ettan DIGE Imager	Multichannel fluorescence imager for 2-D DIGE and fluorescent applications	<ul style="list-style-type: none"> <li>■ 1 gel/run</li> <li>■ 2-D DIGE allows 3 samples per gel incl. internal standard</li> </ul>	<ul style="list-style-type: none"> <li>■ High sensitivity for imaging faint spots</li> <li>■ Sealed environment for scanning and protecting wet samples</li> <li>■ High resolution, low noise images</li> </ul>	On request
	Typhoon variable mode imagers	Multichannel imager for fluorescence, phosphor-imaging and chemi-fluorescence	<ul style="list-style-type: none"> <li>■ 2 gels/run</li> <li>■ 2-D DIGE allows up to 3 samples/gel incl. internal standard</li> </ul>	<ul style="list-style-type: none"> <li>■ Superior resolution, versatility and sensitivity for all imaging applications</li> </ul>	On request
ImageScanner III	Versatile densitometer with high linearity	<ul style="list-style-type: none"> <li>■ 1 gel/run</li> </ul>	<ul style="list-style-type: none"> <li>■ Large linear range</li> <li>■ Consistent scan results</li> <li>■ Quantitative analysis</li> </ul>	4680,-	

## 2D Electrophoresis Systems

Company	Name of product	Short description	Gel format/ Number of gels per run?	Miscellaneous, Specialities, Generally	Price [EUR]
<b>GE Healthcare Life Sciences</b> Contact see page 60	Ettan Spot Picker	Automatically picks selected protein spots from stained or nonstained gels	■ 1 gel/run	<ul style="list-style-type: none"> <li>■ Greater than 99.9% efficiency in spot recovery</li> <li>■ Designed for use with backed and nonbacked gels</li> </ul>	On request
	Ettan Digester	In-gel digestion of proteins from 2-D gel plugs	■ 384 samples/run	<ul style="list-style-type: none"> <li>■ Special needle design minimizes plug loss</li> <li>■ Sensitive down to 100 fmol range</li> </ul>	On request
<b>Intas Science Imaging Instruments</b> Contact: Herr Riemenschneider Phone: +49(0)551-505050 info@intas.de	ChemoCam HR16-3200	Imager for analyzing 2D-Gels	■ Multiple probes possible	-	22.900,-
<b>Invitrogen</b> Paisley, UK www.invitrogen.com Contact: Kurt.Gielen@invitrogen.com	ZOOM Benchtop Proteomics System	Integrated solution, in a mini gel format	■ Mini gel format and 10 strips can be run	■ Large-format 2D gel profiling with sample fractionation, first and second dimension gel electrophoresis, followed by staining with mass spectrometry-compatible stains	N.A.
	Sample Fractionation with ZOOM IEF Fractionator	Reduces highly complex protein samples into fractions, based upon isoelectric point, for analysis by two dimensional gel electrophoresis (2DE), one dimensional gel electrophoresis (1DE), or two dimensional liquid chromatography/mass spectrometry (2D LC/MS)	■ ZOOM Disks are pre-cast polyacrylamide gels that eliminate the need for manual preparation	<ul style="list-style-type: none"> <li>■ Pre-labeled, disposable immobilized buffered disks for single use, ensuring consistent and reproducible fractionation</li> <li>■ Protein samples can be resolved into six fractions from pH 3-12</li> </ul>	N.A.
	1D/2D Electrophoresis - ZOOM IPGRRunner	The 7 cm ZOOM Strips are immobilized pH gradient (IPG) gels available in wide pH range formats (3 - 10, 4 - 7, and 6 - 10) for broader analysis, and in one-unit narrow pH range strips (4.5 - 5.5, 5.3 - 6.3, and 6.1 - 7.1) for expanded protein separation within a specific region of interest	■ ZOOM Gels have a size of Mini Gels (e.g. Novex Gels) covering the full length of 7 cm-IPG strip, 10 strips can be run in the system	<ul style="list-style-type: none"> <li>■ Oil free 2DE system</li> <li>■ 3h separation only</li> <li>■ Easy to handle strips</li> </ul>	N.A.
<b>Serva Electrophoresis</b> Heidelberg, Germany www.serva.de Contact: Jürgen Dreher Phone: +49(0)6221-13840-24 Juergen.Dreher@serva.de	IEF 100	First Dimension Isoelectric Focusing Unit for up to six IPG strips up to 24 cm strip length each, 12.000 Volt max	<ul style="list-style-type: none"> <li>■ 3 mm x 7 cm to 3 mm x 24 cm</li> <li>■ 6 gels (IPG strips)</li> </ul>	<ul style="list-style-type: none"> <li>■ Monitoring of individual strips for increased experimental information</li> <li>■ Cup loading or rehydration loading</li> <li>■ Integrated power supply and peltier cooling minimizes footprint</li> <li>■ Ultra high voltage and current reduces focusing time and enhances focusing results</li> <li>■ Front data ports allow recording of instrument performance if required by GLP</li> </ul>	On request
	SE 900	Vertical Slab Gel Electrophoresis Unit for highly reproducible second-dimension separations on up to six 28 cm SDS PAGE gels	<ul style="list-style-type: none"> <li>■ 25 x 20 cm</li> <li>■ 6 gels</li> </ul>	<ul style="list-style-type: none"> <li>■ External cooling and internal buffer circulation ensures even constant and uniform temperature for reproducible results</li> <li>■ Glass plate sandwiches are hinged cassettes, allows for rapid and easy assembly before use</li> <li>■ Up to six 28 cm glass plates can be run at one time, perfect for high throughput applications</li> <li>■ No upper buffer chamber, no gasket issues, and no upper buffer leakage</li> <li>■ Utilizes minimal parts, easy to use and reliable</li> </ul>	On request
	SE 260 basic	Small Format Vertical 2 Dimensional Electrophoresis	<ul style="list-style-type: none"> <li>■ 8 x 7 cm (cassette: 10 x 10 cm)</li> <li>■ 2 precast SERVAGel 2D cassette gels</li> </ul>	<ul style="list-style-type: none"> <li>■ Run up to two precast SERVAGel 2D gels in mini gel format</li> <li>■ Efficient cooling ensures high resolution separation</li> <li>■ Quick assembly, easy and safe to use</li> <li>■ Requires minimal buffer</li> <li>■ Compact design</li> </ul>	On request
<b>Takara Bio Europe</b> Saint-Germain-en-Laye, France www.takara-bio.eu Contact: Phone: +33(0)1 39 04 68 80 info@takara-bio.eu	Mupid-One electrophoresis system	Complete system for agarose gel electrophoresis, includes removable power supply, buffer tank, gels trays (2 sizes) and combs	<ul style="list-style-type: none"> <li>■ Gel tray (small): 130 mm (W) × 16.5 mm (H) × 59.5 mm (L)</li> <li>■ Gel tray (large): 130mm (W) × 24 mm (H) × 122mm (L)</li> </ul>	<ul style="list-style-type: none"> <li>■ CE marked with improved safety features and materials</li> <li>■ Gel trays withstand up to 100°C agarose gel</li> <li>■ Combs with 2 sizes of wells allow analysis of up to 104 samples (4 rows of 26 wells) with large tray</li> <li>■ Compatible with multichannel-pipette</li> <li>■ Detachable power supply offers 7 output voltages (18V-135V) and timer function (0-99 min)</li> </ul>	515,-