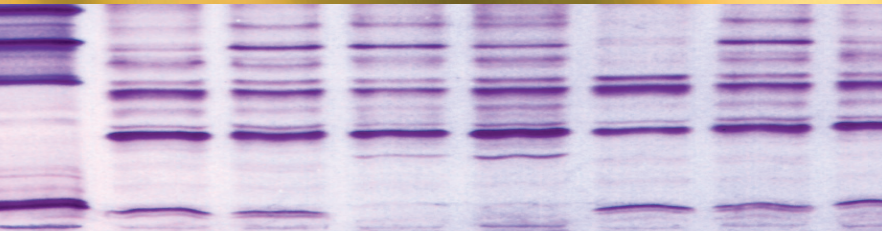


# Isoelectric Focusing

**SERVA**



## Reagents and Equipment

---

SERVA IEF Gels

---

SERVA Protein Standards

---

SERVALYT™ Carrier Ampholytes

---

Gel Supports

---

Reagents and Accessories

---

SERVA Stains for IEF

---

IEF Equipment

---

# All you need for... Isoelectric Focusing

Isoelectric focusing (IEF) can be described as an ingenious process for simultaneous concentration and separation of proteins. IEF employs a pH gradient formed by small amphoteric molecules (ampholytes), e. g. SERVALYT™ carrier ampholytes, to resolve

proteins according to their different pI values (pI: isoelectric point). IEF is an end point method – when the electrophoretic run is completed, proteins will appear as separate, sharp zones, in the order of their pI.

- 1 SERVA Gels for Horizontal IEF
- 2 SERVA Gels for Vertical IEF
- 3 SERVA Protein Standards for IEF
- 4 SERVALYT™ Carrier Ampholytes
- 5 Gel Supports
- 6 Reagents and Accessories
- 7 SERVA Stains for IEF Gels
- 8 Equipment for Isoelectric Focusing



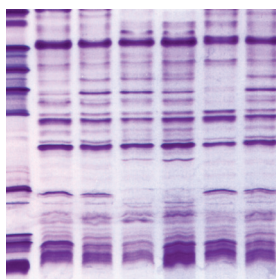
SERVA offers a comprehensive product line for IEF

## SERVA Gels for Horizontal IEF

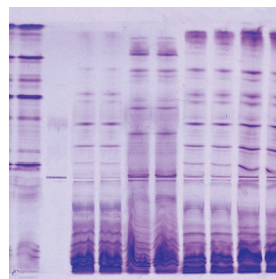
**SERVALYT™ PRECOTES™** gels have a very thin gel layer featuring short separation times and staining/visualization processes. Due to the thin layer, gels only need small sample volumes to be applied. SERVALYT™ PRECOTES™ gels are recommended for a great range of QC tests in food and beverage control, species identification and tasks requiring highly sensitive detection of bands.

Gels are also available as **SERVALYT™ PreNets™** which come with a cast-in supporting fabric, ideally suited for blotting applications.

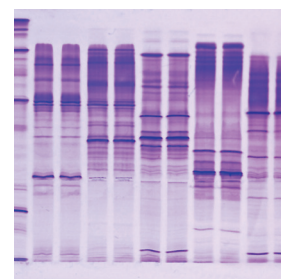
**Blank PRECOTES™/PreNets™** gels are a superb solution to perform flatbed IEF of any pH range. These gels do not contain carrier ampholytes (“blank”), suitable for equilibration with ampholytes of choice and urea.



IEF of proteins isolated from different kinds of potato cultivars



IEF of proteins isolated from different kinds of cheese



IEF of proteins isolated from different kinds of meat

Product	Size	Cat. No.
SERVALYT™ PRECOTES™ pH 3 - 6, size: 125 x 125 x 0.15 mm	5 gels	42974.02
SERVALYT™ PRECOTES™ pH 3 - 6, size: 125 x 125 x 0.3 mm	5 gels	42874.02
SERVALYT™ PRECOTES™ pH 3 - 6, size: 245 x 125 x 0.15 mm	5 gels	42919.03
SERVALYT™ PRECOTES™ pH 3 - 10, size: 125 x 125 x 0.15 mm	5 gels	42965.03
SERVALYT™ PRECOTES™ pH 3 - 10, size: 125 x 125 x 0.3 mm	5 gels	42866.02
SERVALYT™ PRECOTES™ pH 3 - 10, size: 245 x 125 x 0.15 mm	5 gels	42967.02
SERVALYT™ PRECOTES™ pH 3 - 10, size: 245 x 125 x 0.3 mm	5 gels	42867.02
SERVALYT™ PRECOTES™ pH 4 - 6, size: 125 x 125 x 0.3 mm	5 gels	42875.02
SERVALYT™ PRECOTES™ pH 6 - 9, size: 125 x 125 x 0.15 mm	5 gels	42978.02
SERVALYT™ PRECOTES™ pH 6 - 9, size: 125 x 125 x 0.3 mm	5 gels	42878.02
SERVALYT™ PRECOTES™ CSF Kit, size 245 x 125 x 0.3 mm*	1 kit	42800.01
IEF Starter Kit, size: 125 x 125 x 0.3 mm**	1 kit	39060.01
SERVALYT™ PreNets™ pH 3 - 10, size: 125 x 125 x 0.3 mm	5 gels	42738.02
SERVALYT™ PreNets™ pH 4 - 6, size: 125 x 125 x 0.3 mm	5 gels	42748.02
Blank PRECOTES™, size: 125 x 125 x 0.3 mm	5 gels	42759.01
Blank PRECOTES™, size: 245 x 125 x 0.3 mm	5 gels	42710.01
Blank PreNets™, size: 125 x 125 x 0.3 mm	5 gels	42758.01

\*Kit contains 5 gels, buffers, electrode wicks and applicator strips.

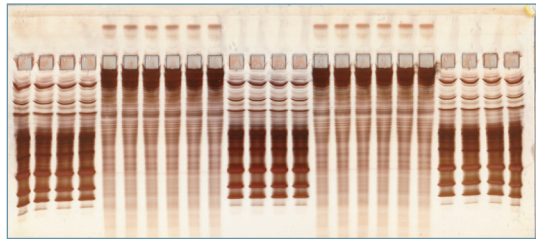
\*\*Kit contains 3 gels, buffers, electrode wicks, applicator strips, cooling fluid, IEF markers and stains.

1 B

## SERVA Gels for Horizontal IEF

**FocusGels** are offered with a gel layer of 0.65 mm which makes them less sensitive to "salt effects" than SERVALYT™ PRECOTES™. Due to the high buffering capacity it is the gel of choice for all separations of salt carrying samples like serum and cerebrospinal fluid, cell and tissue extracts. One of the most important applications is the separation of oli-

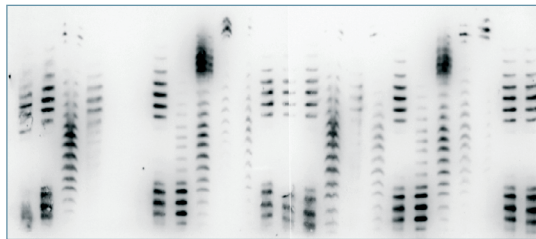
goclonal bands in Multiple Sclerosis diagnostics. FocusGels contain a SERVALYT™ cocktail designed to achieve an optimal pH gradient. Due to thickness of the layer, electrode solutions and electrode strips are not required and the electrodes are placed directly on the gel surface. FocusGels are available with 24 slots, 40 slots, or none.



FocusGel 6-11 24S

The **EPO Test IEF Kit 24S** and the **EPO Doping IEF Kit 30S** are applied in erythropoietin (EPO) analytics. The main application of the EPO Test IEF Kit 24S is to perform quality control on recombinant EPO. The EPO Doping IEF Kit 30S has been developed for differentiation of natural and recombi-

nant EPO in doping controls according to NADA/WADA. Both kits contain 4 EPO IEF Clean Gels (24S gels with 24 and 30S with 30 pre-formed sample wells), one buffer kit for EPO, rehydration additive, EPO-specific SERVALYT™ carrier ampholytes and drying cardboards.



FocusGel 6-11 24S with courtesy of WADA laboratory (Kreisch, Germany)

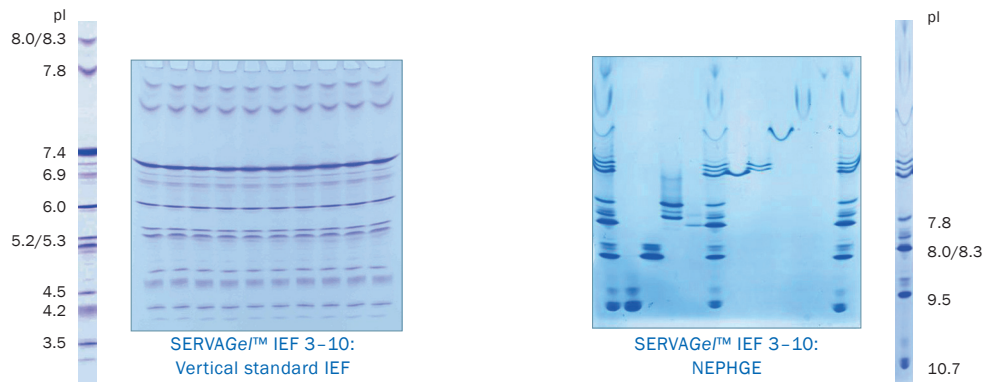
Product	Size	Cat. No.
FocusGel pH 3 - 10, size 250 x 115 x 0.65 mm	5 gels	43327.01
FocusGel pH 3 - 10 24S, size 250 x 115 x 0.65 mm	5 gels	43335.01
FocusGel pH 6 - 11 24S, size 250 x 115 x 0.65 mm	5 gels	43329.01
FocusGel pH 3 - 7, size 250 x 115 x 0.65 mm	5 gels	43328.01
FocusGel pH 6 - 11 40S, size 250 x 115 x 0.65 mm	5 gels	43333.01
EPO Test IEF Kit 24S	1 kit	43388.01
EPO Doping IEF Kit 30S	1 kit	43389.01
Blank FocusGel	5 gels	43412.01
Blank FocusGel 24S	5 gels	43413.01

## 2

## SERVA Gels for Vertical IEF

**SERVAge™ IEF** are vertical precast gels for IEF in mini slab gel format. The gels are casted into unbreakable plastic cassettes of 10 x 10 x 0.7 cm and could be run in standard vertical mini gel apparatus. Gels are available

in a pH range of 3 - 10. For standard applications, apply samples cathodic. For very basic proteins (> pH 7.5) samples could be applied anodic to perform NEPHGE (=non-equilibrium pH gradient electrophoresis).



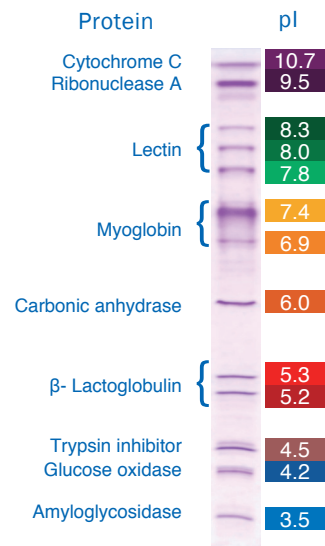
Product	Size	Cat. No.
SERVAge™ IEF 3 - 10, 12 sample wells	10 gels	43240.01
SERVAge™ IEF 3 - 10, 10 sample wells	10 gels	43242.01
SERVAge™ IEF Starter Kit*	1 kit	43205.01
SERVAge™ IEF Runnig Buffer Kit	1 kit	42539.01
IEF sample buffer (2x), sterile filtered	20 ml	42537.01

\* Kit contains 4 gels, buffers, IEF marker and stains

## 3

## SERVA Protein Standards for IEF

SERVA offers two different protein standards for accurate pI determination of unknown proteins by IEF. Standards are applicable to all IEF gels, horizontal and vertical. The standards contain 9 proteins each, 13 isoforms forming a characteristic pattern. One standard is ready-to-use, the other one is lyophilized.



Product	Size	Cat. No.
Protein test mixture for pI determination, pH 3 - 10	10 mg	39211.01
IEF Marker 3 - 10, liquid mix	500 µl	39212.01

■ Achieve high-resolution separation by vertical mini gel IEF

■ Proven IEF standards for accurate pI determination

## SERVALYT™ Carrier Ampholytes

SERVALYT™ carrier ampholytes are low molecular weight molecules of zwitterionic character. They are a mixture of synthetically derived species of average molecular weight distribution of 400 to 1000 dalton and comprise a multitude of varying pI values. In agarose and polyacrylamide gels containing ampholytes, a

linear pH gradient will be formed when an electric field is applied - the ampholyte molecules »carry« a net charge and thus migrate in the electric field between the electrodes as long as they will reach the position of corresponding pI. They will stop moving then and form small plateaus (stationary stacks).

SERVALYT™	2 ml Cat. No.	10 ml Cat. No.	25 ml Cat. No.	100 ml Cat. No.
2 - 4	-	42902.01	42902.02	-
2 - 9 Seed Mix	-	42935.01	42935.02	42935.03
2 - 11	-	42900.01	42900.02	-
3 - 4	-	42922.01	42922.02	-
3 - 5	42903.04	42903.01	42903.02	-
3 - 6	42944.04	42944.01	42944.02	-
3 - 7	-	42945.01	42945.02	-
3 - 10	42940.04	42940.01	42940.02	-
3 - 10 IsoDalt	42951.04	42951.01	42951.02	-
4 - 5	-	42923.01	42923.02	-
4 - 6	42904.04	42904.01	42904.02	-
4 - 7	42948.04	42948.01	42948.02	-
4 - 9 T	-	42910.01	42910.02	42910.03
5 - 6	-	42924.01	42924.02	-
5 - 7	42905.04	42905.01	42905.02	-
5 - 7 PGM	-	42936.01	42936.02	-
5 - 8	42949.04	42949.01	42949.02	-
5 - 9	-	42950.01	42950.02	-
6 - 7	-	42925.01	42925.02	-
6 - 8	42906.04	42906.01	42906.02	-
6 - 9	42913.04	42913.01	42913.02	-
7 - 9	42907.04	42907.01	42907.02	-
9 - 11	-	42909.01	42909.02	-

High resolution due to multimeric composition

Clear background because of very low unspecific binding of dyes and stains



## Supporting Films and Fabrics for Casting Gels

Gel-Fix™ for PAG is a transparent, chemically inert polyester film (180 µm) which is activated on both sites to bind covalently a polyacrylamide gel (PAG). The gel adheres to the film during electrophoresis and all subsequent fixing and staining procedures. To protect the gel layer against drying out or damage, SERVA offers Gel-Fix™ for Cov-

ers, a coated polyester film (75 µm) with a hydrophilic layer to prevent adhesion of the gel. For subsequent blotting NetFix™ for PAG is highly recommended to provide optimal gel support. The polyester fabric is incorporated into the gel matrix during casting. It does not interfere with electrophoresis or blotting.

Product	Size	Cat. No.
GEL-FIX™ for PAG, 265 x 193 mm	36 sheets	42983.01
GEL-FIX™ for PAG, 265 x 125 mm	36 sheets	42993.01
GEL-FIX™ for PAG, 260 x 203 mm	36 sheets	42961.01
GEL-FIX™ for PAG, 260 x 125 mm	36 sheets	42999.01
GEL-FIX™ for PAG, 245 x 125 mm	36 sheets	42980.01
GEL-FIX™ for PAG, 200 m x 193 mm	1 roll	42996.01
GEL-FIX™ for PAG, 50 m x 193 mm	1 roll	42968.01
GEL-FIX™ for PAG, 50 m x 125 mm	1 roll	42966.01
GEL-FIX™ for Agarose, 265 x 150 mm	36 sheets	42955.01
GEL-FIX™ for Agarose, 265 x 125 mm	36 sheets	42981.01
GEL-FIX™ for Agarose, 258 x 125 mm	36 sheets	42982.01
GEL-FIX™ for Agarose, 125 x 125 mm	36 sheets	42997.01
GEL-FIX™ for Agarose, 80 x 125 mm	36 sheets	42998.01
GEL-FIX™ Covers, 280 x 125 mm	36 sheets	42995.01
GEL-FIX™ Covers, 265 x 193 mm	36 sheets	42969.01
GEL-FIX™ Covers, 265 x 125 mm	36 sheets	42970.01
GEL-FIX™ Covers, 260 x 203 mm	36 sheets	42971.01
GEL-FIX™ Covers, 245 x 125 mm	36 sheets	42957.01
NetFix™ for PAG, 265 x 125 mm	36 sheets	42775.01

- Supporting film for all types of polyacrylamide and agarose gel layers
- Can be cut into every desired size
- Stable to temperatures up to 110 °C
- Customized formats are available upon request



## Reagents and Accessories for IEF

SERVA's ready-to-use acrylamide/bis, acrylamide and N,N'-methylene bisacrylamide stock solutions allow you to cast your own gels with the desired acrylamide/bisacrylamide ratio. The solutions are made from highly purified acrylamide and N,N'-methylene bisacrylamide, stabilized and application

tested in isoelectric focusing. Minimize your health risk and optimize your results. Agarose SERVA neutral for IEF is a premium grade agarose for isoelectric focusing, chemically treated to neutralize residual negative charge sites, virtually eliminating electroendosmosis.

Product	Size	Cat. No.
Acrylamide/Bis solution, 29:1 (40 % w/v), 3.3 % C	500 ml	10680.01
	1 L	10680.03
	4x 500 ml	10680.02
Acrylamide/Bis solution, 29:1 (30 % w/v), 3.3 % C	500 ml	10687.01
	1 L	10687.03
	4x 500 ml	10687.02
Acrylamide 4X solution (40 % w/v)	1 L	10677.01
N,N'-Methylene bisacrylamide 2X solution (2 % w/v)	1 L	29197.01
Agarose SERVA neutral for IEF	5 g	11402.02
	25 g	11402.03
Ammonium persulfate (APS), electrophoresis grade	50 g	13376.01
	250 g	13376.02
N, N, N', N'- Tetramethyl-ethylenediamine (TEMED), electrophoresis grade	10 ml	35930.01
	25 ml	35930.02
IEF sample buffer (2x), sterile filtered	20 ml	42537.01
Anode fluid 3 for IEF	50 ml	42984.03
Cathode fluid 10 for IEF	50 ml	42986.03
Applicator strips 2 x 3.5, 19 slots, 100 mm long	6 pieces	42914.01
Applicator strips 3.5 x 2, 15 slots, 100 mm long	6 pieces	42915.01
Applicator strips 3.5 x 2, 43 slots, 240 mm long	3 pieces	42899.01
Applicator strips 7 x 1.2, 24 slots, 263 mm long	3 pieces	42989.01
Applicator strips kit	1 kit	42937.02
Sample Application Pieces 10 x 5 mm	200 pieces	42880.01
Kerosene, low odor	1 L	26945.01
	100 ml	14500.01
Bayol F	1 L	14500.02
	50 ml	43371.01
Cooling Contact Fluid	3 x 50 ml	43371.02
	100 pieces	42972.03
Electrode wicks extra size, 300 x 6 x 1 mm	100 pieces	42987.03
Electrode wicks long size, 240 x 6 x 1 mm	100 pieces	42988.01
Electrode wicks standard size, 120 x 6 x 1 mm	100 pieces	42988.01



## SERVA Stains for IEF Gels

Depending on the required sensitivity and/or application IEF gels may be stained either by SERVA Blue W, SERVA Violet 17 or by silver. The SERVA Violet 17 Staining Kit is a fast and convenient solution for rapid staining in routine applications. SERVA offers two different silver staining kits for

highly sensitive staining of protein bands. For staining gels in diagnostics of Multiple Sclerosis (MS) the SERVA CSF Silver Staining Kit has been developed. Beside kits as complete solutions a comprehensive product line of dyes and reagents for staining IEF gels is available.

	<b>SERVA Violet 17 Staining Kit</b>	<b>Silver Staining Kit Native PAGE</b>	<b>SERVA CSF Silver Staining Kit</b>
Type of Stain	Colloidal Violet 17	Fast silver stain	Highly sensitive, for MS diagnostics
Detection	Visual, colorimetric	Visual, colorimetric	Visual, colorimetric
Sensitivity	100 ng	1 ng	0.1 ng
Staining time	30 min	45 – 60 min	200 min
Protocol	Fix, rinse, stain, water-based destain	Fix, wash, sensitize, wash, stain, wash, develop, wash, stop	Fix, wash, sensitize, wash, stain, wash, develop, wash, stop
For Densitometry	✓	✗	✗
MS compatible	✓	✓	✓
No. of gels stained	5 large gels or 10 mini gels	25 mini gels	5 large gels
Cat. No.	35074.01	35077.01	43398.01

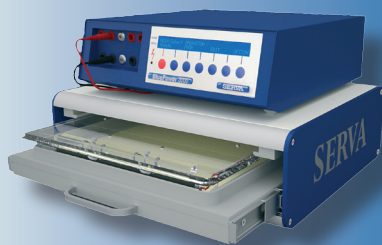
Product	Size	Cat. No.
SERVA Blue G	5 g	35050.01
	25 g	35050.02
	100 g	35050.03
SERVA Blue R	5 g	35051.01
	25 g	35051.02
	100 g	35051.03
SERVA Blue W	25 g	35053.02
	100 g	35053.03
SERVA Violet 17	5 g	35072.01
	25 g	35072.02
	100 g	35072.03
Coomassie® Brilliant Blue G 250	25 g	17524.01
	100 g	17524.02
Coomassie® Brilliant Blue R 250	25 g	17525.01
	100 g	17525.02

**SERVA CSF Silver Staining Kit for detection of oligoclonal bands in liquor and serum allows protein detection with high sensitivity**

## Equipment for Isoelectric Focusing

Despite of high quality gels and reagents, the equipment is a key factor to achieve best results in electrophoresis. Only the use of electrophoresis chambers providing an uniform electric field during the run and a reliable power supply result in perfect separations. SERVA developed HPE™ BlueHorizon™,

HPE™ BlueTower, BlueVertical™ PRIME™, BluePower™ Power Supply and BlueShake 3D in close cooperation with researchers throughout the world. The devices are manufactured in Germany according to the specifications determined by SERVA.



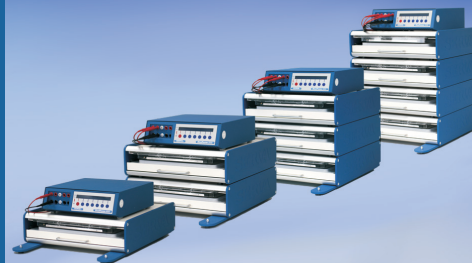
### HPE™ BlueHorizon™

The HPE™ BlueHorizon™ is a PAGE and IEF. Systems including flatbed system for optimized performance in cooled flatbed unit are available upon request.

### HPE™ Blue Horizon™ Multi Deck

The HPE™ BlueHorizon™ modular deck combines 2, 3 or 4 flat bed systems into one space and budget saving unit that is temperature controlled by one

chiller and driven by one single power supply. The Multi Decks offer high throughput capacity for 1D applications like SDS PAGE or IEF and 2D PAGE.

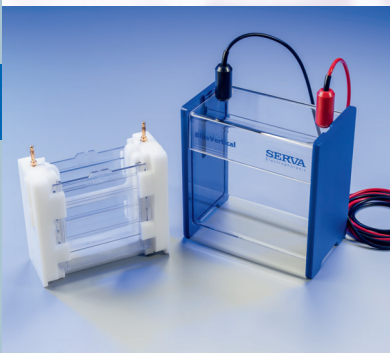


### HPE™ BlueTower

The SERVA HPE™ BlueTower System is a multilevel flatbed electrophoresis device providing unmatched resolution, reproducibility and sensitivity.

Up to four polyacrylamide gels can be operated simultaneously to conduct either 1- and 2-dimensional separations.

Product	Size	Cat. No.
HPE™ BlueHorizon™	1 unit	HPE-BH
HPE™ BlueHorizon™ Double Deck	1 unit	HPE-BHD
HPE™ BlueHorizon™ Triple Deck	1 unit	HPE-BHT
HPE™ BlueHorizon™ Quadra Deck	1 unit	HPE-BHQ
HPE™ BlueTower	1 unit	HPE-T02
HPE™ BlueTower System	1 system	HPE-TS2



### BlueVertical™ PRiME™

The BlueVertical™ PRiME™ electrophoresis mini tank system has been developed to run pre-cast gels in 1D SDS PAGE, also in 2D PAGE, native PAGE, IEF or nucleic acid PAGE applica-

tions. The unique innovative clamp system keeps the gel cassettes in their correct position at the inner core running module, leak-free and ready to start within seconds.



### BluePower™ Power Supplies

The BluePower™ Power Supplies are easy to operate and fully programmable. Change parameters without interrupting the run. The power supplies have a stable metal

housing and a large LCD display. The upgrade with the BluePower™ Control Kit allows to monitor V, mA and W over time as well as loading and storing of program settings.

### BlueShake 3D

Due to the large platform of the instrument (35 x 35 cm) and the chosen rotation

angle of 4°, this shaker is the best choice for staining large format gels.



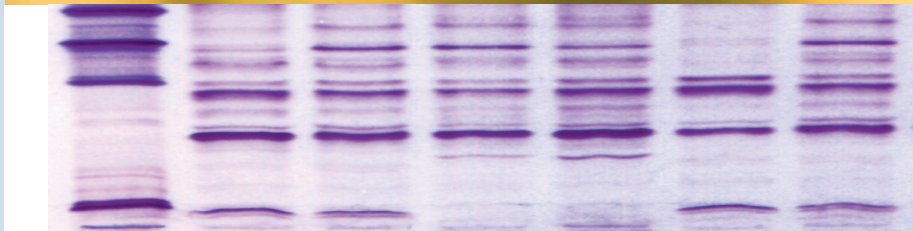
### Digital Imaging and Analysis System III

The Digital Imaging and Analysis System III is the ideal solution to master the daily tasks of documentation and 1D gel analysis in routine laboratory work. Solid hardware including a digital SLR camera

and easy-to-grasp 1D analysis software are combined to provide an excellent tool to meet your needs. UV-, blue- and white-light transilluminator or epi-white light are optional.

Product	Size	Cat. No.
BlueVertical™ PRiME™	1 unit	BV 104
SERVA BlueShake 3D	1 unit	BS-3D
HPE™ Power Supply 1500 (1500 V, 400 mA, 300 W)	1 unit	HPE-PS1
HPE™ Power Supply Package	1 system	HPE-PSP
MP 300 V Power Supply (300 V, 700 mA, 150 W)	1 unit	MP-300V
BluePower™ Control Kit	1 kit	BP-PCSV01
Digital Imaging and Analysis System III, basic	1 system	DIAS-III-B
Digital Imaging and Analysis System III plus GelScan 6.0	1 system	DIAS-III
Digital Imaging and Analysis System III plus LabImage 1D L-340	1 system	DIAS-III-L

SERVA Electrophoresis GmbH  
Carl-Benz-Str. 7 · 69115 Heidelberg  
Germany · Fon: +49 6221 13840-0  
Fax: +49 6221 13840-10  
E-mail: [info@serva.de](mailto:info@serva.de) · [www.serva.de](http://www.serva.de)



## Some examples of versatile IEF applications:

- Agriculture**
  - Maize
  - Wheat
  - Sorghum
  - Carot
  - Potato
- Veterinary**
  - Pork
  - Cattle
  - Turkey
  - Chicken
- Food**
  - Meat
  - Cheese
  - Pasta
- Health**
  - Multiple Sclerosis
  - EPO
  - Antibody
  - Recombinant Proteins