SERVA Blue*Line*

Instruments for Electrophoresis

HPE™ BlueHorizon

Flatbed Electrophoresis System

Instruction manual

Cat. No. HPE-BH

SERVA

General information

Keep the instruction manual close at hand nearby your device. We structured this document in a way that you can refer to the desired information via the index. We recommend to read all the chapters to obtain detailed explanations and operations notes. Aim of this instruction manual is to make the operation accessible to you with a language easy to understand. Get in touch with our technical service should any questions arise or explanations being unclear (contact details, see rear page).

By using the packing list, please check after unpacking, if all parts of the device are complete and the device is undamaged. If this is the case, please inform SERVA Electrophoresis GmbH at once.

The warranty period is 12 months and starts at delivery. We ask for setting the packing material aside until warranty period is expired.

Transport and important data

- There are no specific requirements during transport
- Note catalog and serial number here in advance:

  Catalog number:

  Serial number:

IMPORTANT NOTICE

Before installation, remove the security lock. It is located on the rear side of the device. As shown below, unscrew and remove the screw completely from the corpus.

Our target group

The SERVA Blue*Line* devices are intended for laboratory use. English is considered as the global language of science. The target group of this instruction manual is skilled laboratory staff. Among them count workers-in-training (e.g. trainee, apprentice, diplomate and postgraduate) after briefing as well. Local safety regulations (e.g. biological, chemical, radioactive and medical risk- und security level) cannot be considered in this manual. The liability in these issues lies with the user.

Security definitions

ATTENTION	Light to heavy injuries are possible.
CAUTION	Light to heavy injuries are certain.
WARNING	Irreversible to fatal injuries are possible.
DANGER	Irreversible to fatal injuries are certain.

Security symbols

Attention, Danger! The symbol is a sign of a common injury risk for human. It refers to both transport, operation and maintenance of the device. The security definitions above bespeak the degree of the endangerment. The accompanying text explains and indicates to possible preventions.

Attention, Electric Shock! The symbol is a sign of an injury risk for human caused by electrical shock. It refers to both transport, operation and maintenance of the device. The security definitions above bespeak the degree of the endangerment. The accompanying text explains and indicates to possible preventions.

SERVA assistance

Assistance	Contact
Sales Team (Germany)	Contact your local sales representative to receive product information, to arrange demonstrations or to inquire quotations and product samples.
Distributor (International)	Outside Germany, please contact your local distributor for product information, pricing and inquiries. The contact details of our worldwide distributors are listed on our website.
Customer Care	Our sales department is informing you about prices, inquiries and shipment. The contact details are listed on the rear page of the manual.
Technical Service	Our Technical Service is your contact point for technical and scientific questions about our products.
Product Specialist	Our Product Specialists for individual applications are glad to assist you with improving your method and solve problems. Ask our Technical Service for the contact.
Download Center	In our Download Center you find all Manuals, ApplicationNotes and TechNotes regarding our products. Downloadable are brochures, the online catalog and various certificates as well. Additionally, on the single product pages in the online shop, MSDS and the specifications are deposited.
Webinar Archives	Inform yourself about our future webinar dates under Events on our website. Recorded videos of previous webinars can be downloaded from our Webinar Archives.

General lab safety information

- In the lab, wear gloves, lab coat and safety goggles. Do **not** wear jewelry or watches.
- Avoid contact with mouth, nose and eyes by hand before having your hands washed. Treat and dress small wounds sufficiently.
- Before leaving the lab, take your safety equipment off and wash your hands thoroughly with soap.
- Change the gloves frequently and remove them before using a telephone, a light switch or a writing utensil.
- Clean your equipment, lab bench and devices frequently and directly after contamination with a mild soap and disinfectant.

Hazards

If the user follows the safety regulations as described below, the SERVA Blue*Line* devices are designed in a way that safe working is ensured. Any warranty claim will be voided if the device or its spares are changed and modified by an unauthorized person. Working contrary to regulations will void warranty claim additionally.

Electrical hazard

WARNING

The device works with current up to 3000V direct current. Irreversible to fatal injuries are possible!

- Disconnect the device from the power supply before and after electrophoresis.
- Disconnect the device from the power supply before cleaning and let dry before connecting again. Never use aggressive chemical and polishes.
- Do not spill or store liquids on top of the unit.
- Do not work with the device if physical defects are observed.
- If liquid is spilled into the HPE™ BlueHorizon, disconnect the high voltage power supply and the AC main power immediately before opening the safety enclosure lid. Contact SERVA Electrophoresis.
- Do not operate or connect power sources to the equipment if there is any mechanical damage.
- The supplied DC cables are rated for 5,000V. Only use cables and adaptors supplied with the HPE™ BlueHorizon or ensure that these have a suitable DC insulation compliance for the used voltages.
- Maintenance and repair must be performed by SERVA Electrophoresis GmbH only.

Cleaning and disinfection

Clean the SERVA Blue*Line* devices before first start-up and then frequently with a mild detergent (0.1% SDS solution) followed by distilled water as follows:

First, disconnect the device from the grid before start cleaning. Use lintless cloth soaked in water only. To remove tenacious dirt, lintless cloth soaked in 0.1% SDS solution can be used before. Never use aggressive cleaner or solvents. Let everything dry before reconnecting and start working. Parts of the device that were in contact with other liquids than water have to be cleaned after each usage to avoid salting-out and encrusting. Cleaning of the platinum electrodes after each run is particularly important to prevent crystallization of buffer salts, which can result in uneven contact. Electrodes should be cleaned with distilled water-moistened lint-free tissue.

If contaminated, choose the disinfection method fitting your local regulations and guidelines. First, disconnect the device from the grid and let the device cool down before start disinfecting. After disinfection clean as described before.

If the device needs to be shipped back to SERVA, perform cleaning and disinfect if necessary. Document this on the Decontamination Certificate (Download Center on www.serva.de) and enclose it in the shipping box.

CE Certification

Important: This SERVA product is designed and certified to comply the safety guideline IEC 61010-1 + Corr.

CE certified products are safe in use if utilized as described in the manual. The device has not to be modified. After any modification, warranty and CE certification becomes null and void. Additionally, these modifications may represent a potential source of danger.

SERVA is not responsible for any harm or injury that was caused by device modification, improper use or unspecified applications.

Imprint

Table of Contents

1 Introduction

The HPE™ BlueHorizon is a flatbed system for horizontal electrophoresis. Main applications are isoelectric focusing (IEF), 2D and SDS polyacrylamide gel electrophoresis and the separation of nucleic acids in polyacrylamide or agarose gels.

The stable and easy-to-clean metal housing allows a space-saving positioning of the power supply on top. The system is cost-saving, because it works without buffer chambers. Instead, fabric wicks are soaked with concentrated electrophoresis buffers.

The integrated drawer holds the cooling plate that is connected to the SERVA HPE™ Cooling Unit (cat. no. HPE-CU1). The cooling plate is made from a special ceramic material (maximum gel size 260 x 205 mm) for efficient heat conductance down to 4 °C resulting in rapid and straight migration and therefore highly focused spots and bands.

The electrode lid comes with one pair of platinum electrodes. They can be installed to three electrode positions serving a wide variety of different gel sizes. A lid with triple electrodes for bi-directional electrophoresis is available optional.

With the drawer / lid arrangement, the plastic-backed gels are protected from dust and light during the run to avoid photo-bleaching of fluorescent labels.

2 Installation

2.1 Packing list

- HPE™ BlueHorizon base unit
- 1 lid packed with installed electrodes
- 2 4 mm power supply cables (red / black)
- 1 m thick-wall silicone tubing
- 4 hose clamps
- Manual

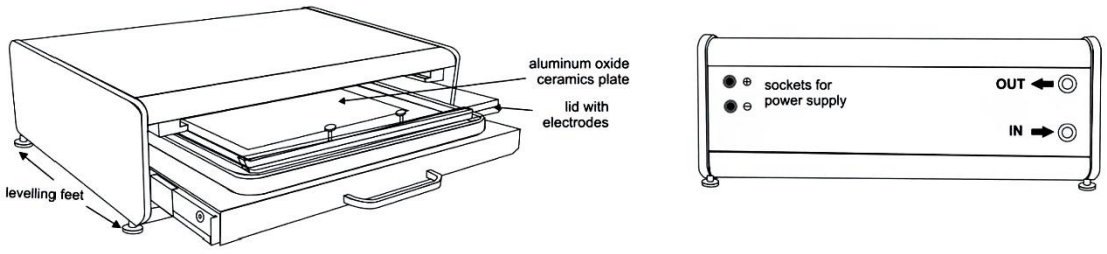
2.2 Operation conditions

Use the HPE™ BlueHorizon only in closed laboratories; maximum relative humidity up to 80% (at a temperature up to 31 ° C), decreasing linearly to 50% relative humidity (at a temperature up to 40 ° C), with a maximum altitude of 2000 m (NN).

2.3 Specifications

Max Voltage, Current	3000V, 25mA
Max gel size	260 x 205 mm
Electrode distance	270, 195, 115 mm
Electrode material	Platinum rod
Operating temperature	4 °C – 65 °C
Dimensions (W x D x H)	450 x 500 x 120 mm
Weight	6kg

2.4 Set up



HPE™ BlueHorizon (left: side/front view, right: back view)

1) Mount base unit

Place the base unit on the lab bench.

2) Connecting the SERVA HPE™ Cooling Unit (Chiller)

IMPORTANT NOTE: Warm air should not be exhausted towards the BlueHorizon!

Connect the BlueHorizon to the chiller using the provided tubing and fix them with the hose clamps. It is important to tighten these clamps sufficiently to obtain an air-tight seal. The chiller ”Out“ must be connected to the BlueHorizon “In” and the chiller “In” to the BlueHorizon “Out”. If the flow-direction is wrong, the cooling will work incorrectly. In order to protect the cooling plate from corrosion, the cooling liquid must contain an anti-corrosive additive (Cat. no. 43392)

3) Air Removal

For efficient cooling, it is vital to remove any air from within the cooling plate. Switch on and leave the chiller running until all of the air in the connecting pipes is removed, this may take several minutes. Then fill the chiller reservoir up with water as the BlueHorizon takes up about 1 litre.

4) Electrode Lid Storage

Remove the protection film and paper. Insert the lid into its park position above the drawer with the connecting plugs of the lid towards the backside of the BlueHorizon.

The electrodes are carefully constructed from platinum coated titanium rods and could be damaged if not handled correctly. When not in use, always insert the lid into its park position. Never place the lid on the bench with electrode side down to avoid damage.

5) Connecting the Power Supply

Connect the power supply (black / red cables). Place it on top to save bench space.

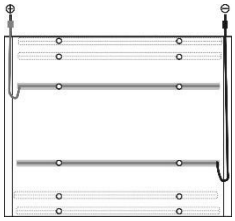
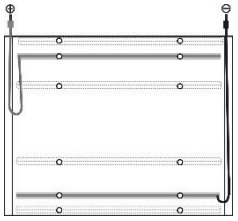
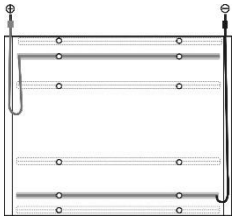
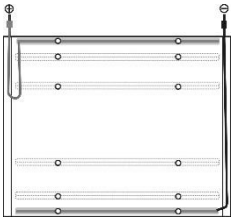
3 Operation

In this section, general instructions for loading and running gels on the HPE™ BlueHorizon are described. Running conditions for specific gel types, videos, and other useful information are provided on www.serva.de.

Important Information: Always wear powder free disposable gloves when handling gels or stripes. Do not open a drawer during an active electrophoresis run without switching off or pause the power supply. Opening a drawer during running power causes your power supply to detect a “ground leakage”. That may cause a disturbance of the running programme or in the worst case damages the power supply.

3.1 Adjust the electrodes

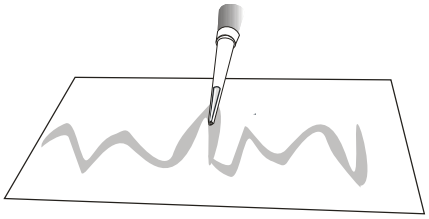
In the electrode lid, the electrode positions can be adjusted to different gels sizes. When changing the electrode positions, place the electrode lid half way in the park position and loosen the screws of the first electrode. Be careful to catch the nut on the underside of the lid into which the screw fits. Then turn the lid and change the second electrode as described above. Please note: The position for PRECOTES™ is not fixed but adjustable. Before each run with PRECORES or CleanGels IEF, superpose the electrodes and the wicks on the gel.

Gels	PRECOTES CleanGel IEF FocusGel	SDS Gel CleanGel	2D HPE Triple / Double Gels	2D HPE Large Gel
Application	IEF	1D PAGE	2D PAGE	HiRes 2D PAGE
Electrode position				

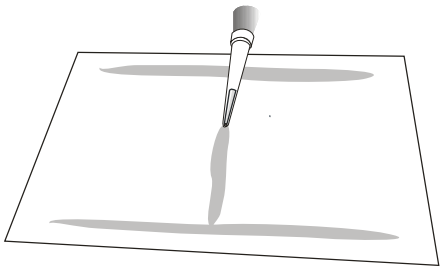
3.2 Apply a gel

Important Information: To avoid water condensation on the gel surface, do not yet switch on the chiller.

A specially formulated cooling fluid is added between the surface of the cooling plate and the gel to ensure good contact, even temperature control and efficient heat dissipation. For a standard format gel spread 3 ml cooling contact fluid onto the center of the cooling plate. For a large format gel spread 6 ml cooling contact fluid onto the cooling plate in the shape of an “H”:

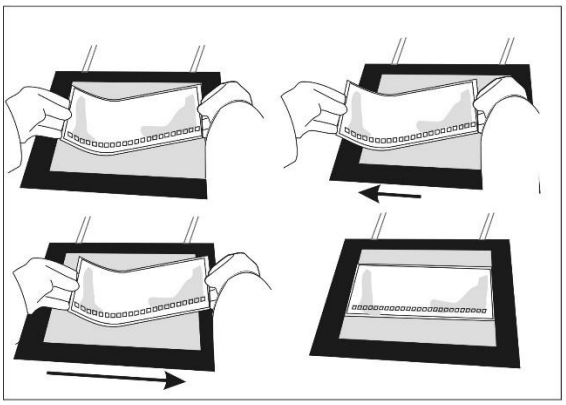


standard gel format

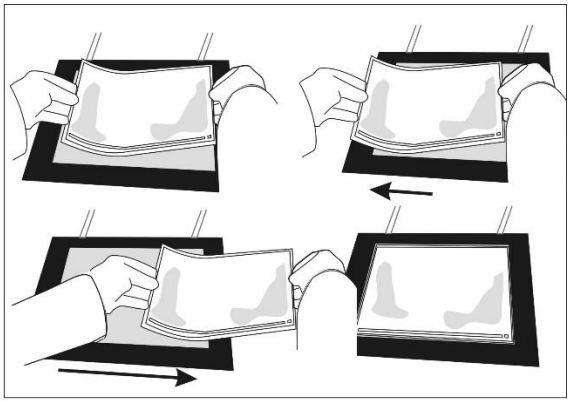


large gel format

To disperse, slide a gel bent into a U-shape from side to side. The sides of the gel are then gently lowered. Avoid air bubbles between the cooling plate and gel. Excess cooling fluid from around the gel is removed using a lint-free tissue.



standard gel format



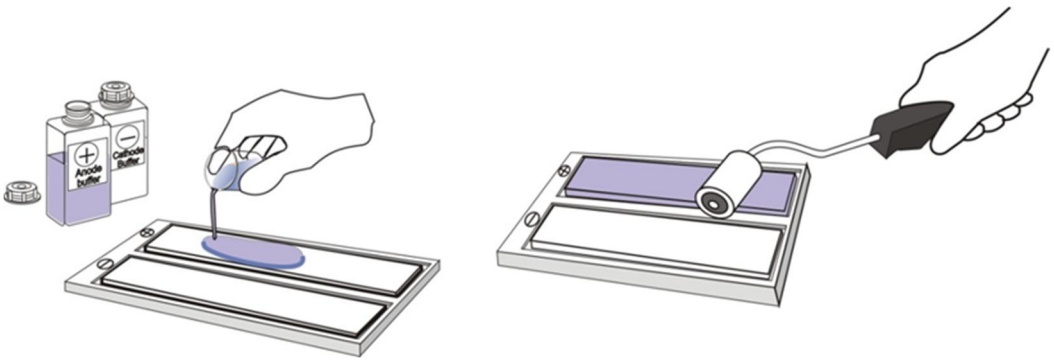
large gel format

3.3 Prepare Electrode Wicks

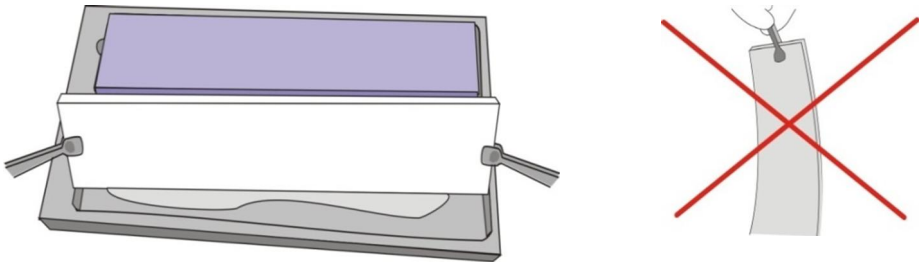
3.3.1 SDS Gel Kit, CleanGel, HPE Gel

All buffers needed are provided in the SERVA Gel and Buffer Kits. We do not recommend different or self-made components.

Electrode wicks, soaked in an appropriate buffer, provide a convenient alternative to buffer tanks. The wicks should be fully soaked with 42 ml buffer for at least 10 minutes. The wicks should be rolled to remove air bubbles and to distribute the buffer evenly:



Electrode wicks are applied with the cathode (white) at the front, anode (blue) at the back. Remove excess electrode buffer from the wicks by tilting the electrode wicks along one long edge and dab it on the paper pool bottom. When moving the wicks always hold them horizontal, as holding them at a vertical angle can result in unequal buffer concentration.



The electrode wicks should overlap the gel by at least 2 mm. It is important that buffer is not dropped onto the gel surface and therefore avoid moving the buffer soaked wicks over the gel.

3.3.2 PRECOTES, PreNets, CleanGel IEF

Place two electrode wicks (5 mm) soaked with anode and cathode buffer. Apply them on the corresponding gel edges: acidic solution on the Anode (+) side, basic solution on the cathode (-) side. Wicks must not extend beyond edge of gel but be aligned parallel to each other and corresponding to where the electrodes will be placed.

3.3.3 FocusGel

On FocusGels, the electrodes are directly placed onto the gel without the need of buffer soaked wicks.

3.4 Sample preparation and loading

3.4.1 SDS Gel Kit

1) Add one volume sample to one volume sample buffer (2x). Reduce, alkylate heat your sample.

2) Pipette samples into the sample wells.

3.4.2 CleanGel

Prepare samples according to the related gel instruction manual or specific application procedure.

3.4.3 2D HPE Gel

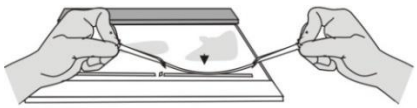
1) Equilibrate the IPG strip after 1st dimension

The method is described in the gel manual.

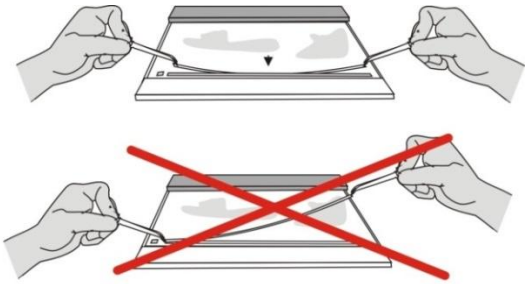
2) Applying the IPG-strip

Some IPG strips possess a long protruding support film on the ends: In this case the plastic film support on both sides of the IPG-strip must be trimmed just beyond the gel.

The strip should be carried horizontally and applied to the slot center first. The strip should be placed in the IPG slot, gel side down, with the anodal side to the right. To ensure good contact in the slot the back of the forceps is slid gently along the back of the IPG strip.



standard gel format



large gel format

3.4.4 PRECOTES, PreNets

1) Adjust sample concentration to about 1 - 10 mg protein/ml and desalt it by dialysis.

2) Centrifuge the samples for 5 minutes at approx. 12,000 g; use only the supernatant.

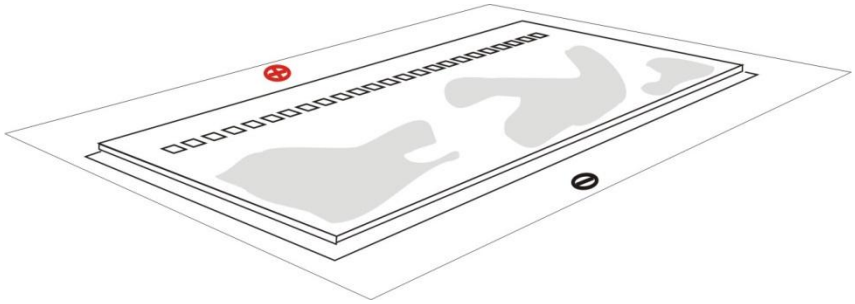
3) Position the applicator strip on the gel and slightly pressing it with the back of a forceps. Apply the required sample volume using a pipette. Do not leave empty slots between samples. Depending on sample type, it is possible to apply the samples with or without pre-focusing.

3.4.5 CleanGel IEF

Prepare samples according to the related gel instruction manual or specific application procedure.

3.4.6 FocusGel

For most sample types, the position of the pre-formed wells is optimized for anodal application. Nonetheless, the gels can be turned around for cathodal application if needed.

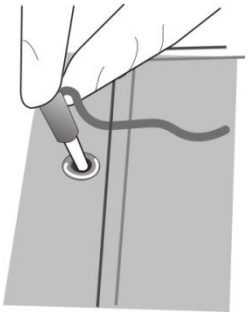


1) Apply the required sample volume using a pipette. Do not leave empty slots between samples. Depending on sample type, it is possible to apply the samples with or without pre-focusing.

2) Take care that the electrodes are placed directly on the FocusGel surface at the gel edges and not on the support film!

3.5 Start the run

1) Close the lid while lowering the electrodes on the wicks. Plug in the leads into the drawer.



2) Switch the thermostatic circulator on, set to

- HPE Gels: 15 °C
- SDS Gels: 15 °C
- Clean Gels: dependent on the application (see gel manual)
- PRECOTES, PreNets: 10°C
- CleanGel IEF: 10°C
- FocusGel: dependent on the application (see gel manual)

Note: During Electrophoresis the electric resistance of the gel is slowly increasing. Therefore, the heat production during the starting phase is rather low. It does not cause overheating when the chiller begins cooling at the same time the electrophoresis is started.

3) Start the run according to the settings described in the gel manual.

3.6 After electrophoresis

Remove the wicks (if applied), lift the gel off and proceed with your application. Clean the cooling plate and the electrode with a water soaked tissue. Place the lid to its park position.

4 Troubleshooting

Symptom	Cause	Remedy
No water flow after chiller is switched on.	Kinked tube.	Straighten tubing.
Air bubbles between film-backing and cooling plate.	Insufficient volume of cool contact fluid.	Lift up gel on one side and apply a higher volume.
Water droplets on gel surface.	Gel was pre-cooled without lid at high humidity conditions leading to water condensation.	Do not switch on chiller during gel application and sample loading.
No electric current.	Lid or power supply not plugged.	Check connections between lid / drawer and to power supply.
Condensation inside of electrode lid.	The gel gets hot during electrophoresis because of insufficient heat dissipation.	Do not forget to switch chiller on!
		Check chiller temperature and ensure no other apparatus is connected to the same chiller.
Front is curved instead of straight.	The gel gets hot during electrophoresis because of insufficient heat dissipation.	See above
	BlueHorizon is subject to hot exhaust from chiller or other apparatus.	Relocate chiller or other apparatus.
	The gel gets hot because too much power is applied.	Strictly, follow the manual.
Migration of front is very slow and will not reach the anode in time.	Electric field is too low.	Adjust the mA and W settings.
Front is slanted, not straight.	Uneven buffer concentration within the electrode wicks.	Always hold electrode wicks horizontal when carrying them to the gel.
Condensation water develops inside electrode lid near to IPG strip(s).	Local heat production at IPG strip(s) because of electro endosmotic effect.	Remove IPG strip(s) from gel after the first 70 minutes and then continue the run.

Minor disturbance(s) in the front.	Buffer drop(s) fell on the gel surface.	Avoid passing wicks over gel surface.
	Air bubbles inside the wicks.	Gently roll wicks in PaperPool to remove air.
2D Gels: Irregular bulging of the front on one side.	Equilibration buffer unequally distributed within the IPG strip(s).	Hold the IPG strip(s) horizontal, start in the middle when placing the strip into the slot.
2D Gels: Run stops, front does not continue to migrate, sparking at the IPG strip(s).	Strong electro endosmotic effect at the IPG strip(s), because it has not been removed after the first 70 minutes.	Remove IPG strip(s) from gel after the first 70 minutes and then continue the run.
Local disturbances in the pattern	Air bubble in the cooling contact fluid layer	Use sufficient cooling contact fluid on the cooling plate (3 for standard size gels, or 6 ml for large gels), distribute is evenly by sliding the gel with the film-backing several times left and right.
	Air bubble in a buffer wick	Distribute the buffer solutions evenly in the wicks by thoroughly rolling

5 Ordering Information

Isoelectric Focusing		
SERVALY T™ PRECOTES™ pH 3–10	125 x 125 x 0.3 mm	42866.02
SERVALY T™ PRECOTES™ pH 3–10	245 x 125 x 0.3 mm	42867.02
SERVALY T™ PRECOTES™ pH 3–6	125 x 125 x 0.3 mm	42874.02
SERVALY T™ PRECOTES™ pH 4–6	125 x 125 x 0.3 mm	42875.02
SERVALY T™ PRECOTES™ pH 6–9	125 x 125 x 0.3 mm	42878.02
SERVALY T™ PRECOTES™ pH 3–6	245 x 125 x 0.15 mm	42919.03
SERVALY T™ PRECOTES™ pH 3–10	125 x 125 x 0.15 mm	42965.03
SERVALY T™ PRECOTES™ pH 3–10	245 x 125 x 0.15 mm	42967.02
SERVALY T™ PRECOTES ™ pH 3–6	125 x 125 x 0.15 mm	42974.02
SERVALY T™ PRECOTES™ pH 6–9	125 x 125 x 0.15 mm	42978.02
SERVALY T™ PRECOTES ™ CSF Kit	245 x 125 x 0.3 mm	42800.01
SERVALY T™ PRECOTES ™ CSF Kit	125 x 125 x 0.3 mm	42801.01
Blank PRECOTES™	245 x 125 x 0.3 mm	42710.01
Blank PRECOTES™	125 x 125 x 0.3 mm	42759.01
SERVALY T™ PreNets™ pH 3–10	125 x 125 x 0.3 mm	42738.02
SERVALY T™ PreNets™ pH 4–6	125 x 125 x 0.3 mm	42748.02
Blank PreNets™	125 x 125 x 0.3 mm	42758.01
FocusGel 3–10	250 x 115 x 0.65 mm	43327.01
FocusGel 3–10 24S	250 x 115 x 0.65 mm	43335.01
FocusGel 6–11 24S	250 x 115 x 0.65 mm	43329.01
FocusGel 6–11 40S	250 x 115 x 0.65 mm	43333.01
FocusGel 3–7	250 x 115 x 0.65 mm	43328.01
FocusGel 3–7 24S	250 x 115 x 0.65 mm	43387.01
FocusGel 4–5 24S	250 x 115 x 0.65 mm	43332.01
FocusGel 4–6 24S	250 x 115 x 0.65 mm	43334.01
FocusGel 6–9 24S HEM	250 x 115 x 0.65 mm	43330.01
SDS PAGE		
SDS Gel Kit 10 % 25S	250 x 125 x 0,45 mm	43359.01
SDS Gel Kit 10 % 52S	250 x 125 x 0,45 mm	43360.01
SDS Gel Kit 15 % 25S	250 x 125 x 0,45 mm	43361.01
SDS Gel Kit 15 % 52S	250 x 125 x 0,45 mm	43362.01
1D SDS TA Gel Kit 12.5 % 25S	260 x 125 x 0,43 mm	43415.01
1D SDS TA Gel Kit 7.5 % 25S	260 x 125 x 0,43 mm	43416.01
1D SDS TA Gel Kit NF 12.5 % 25S	260 x 125 x 0,43 mm	43379.01
1D SDS TA Gel Kit NF 7.5 % 25S	260 x 125 x 0,43 mm	43314.01
SDS Urine Gel Kit 25S	260 x 125 x 0,43 mm	43391.01
1D Gel Kit NF 12.5 % 25S	260 x 125 x 0,43 mm	43363.01
1D Gel Kit NF 15 % 25S	260 x 125 x 0,43 mm	43364.01
Special Application		
CleanGel 10 % 25S	250 x 125 x 0.43 mm	43338.01
CleanGel 10 % 52S	250 x 125 x 0.43 mm	43340.01
Sortex Kit 10 %	250 x 125 x 0,43 mm	43358.01
EPO Test IEF Kit 24S	250 x 125 x 0,43 mm	43388.01
Nucleic Acid Electrophoresis		
DNA Fragment Analysis Kit	250 x 125 x 0,43 mm	43353.01
2D Electrophoresis		
2D HPE™ Triple-Gel NF 12.5 % Kit	250 x 110 x 0,65 mm	43300.01
2D HPE™ Triple Gel NF 10–15 % Kit	250 x 110 x 0,65 mm	43301.01
2D HPE™ Double Gel NF 12.5 % Kit	250 x 110 x 0,65 mm	43302.01
2D HPE™ Double Gel NF 10–15 % Kit	250 x 110 x 0,65 mm	43303.01
2D HPE™ Large Gel NF 12.5 % Kit	250 x 110 x 0,65 mm	43304.01
2D HPE™ Large Gel NF 10–15 % Kit	250 x 110 x 0,65 mm	43305.01
2D HPE™ Triple Gel 12.5 % Kit	250 x 110 x 0,65 mm	43306.01
2D HPE™ Triple Gel 10–15 % Kit	250 x 110 x 0,65 mm	43307.01
2D HPE™ Double Gel 12.5 % Kit	250 x 110 x 0,65 mm	43308.01
2D HPE™ Double Gel 10–15 % Kit	250 x 110 x 0,65 mm	43309.01
2D HPE™ Large Gel 12.5 % Kit	250 x 110 x 0,65 mm	43310.01
2D HPE™ Large Gel 10–15 % Kit	250 x 110 x 0,65 mm	43311.01

SERVA Electrophoresis

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