

BlueLine
Instruments for Electrophoresis

INSTRUCTION MANUAL

Blue Horizon™ **Horizontal Flatbed Electrophoresis Unit**

SERVA
Electrophoresis

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Warning

This unit is capable of delivering potentially lethal voltage when connected to a power supply and is to be operated only by qualified technically trained personnel.

The BlueHorizon™ flatbed electrophoresis system complies with European safety regulations (CE). It is designed and produced to give long service and reproducible results in your laboratory. A few moments spent reading these instructions will ensure that your expectations are reflected in the successful use of the apparatus.

Please read the entire operator's manual thoroughly before operating this unit.

First check with the help of the packing list that the electrophoresis chamber has been received complete and undamaged following shipment and check that all components and accessories are present. Any damages or missing parts must be notified to **SERVA Electrophoresis GmbH Heidelberg** resp. to the responsible distributor immediately. **SERVA Electrophoresis GmbH** cannot accept responsibility for goods returned without prior notification.

Warranty is 12 months for the chamber resp. 36 months for the carbon electrodes from the date of delivery.

Please retain all packaging materials until warranty period has expired.

Ver. 05/06

1. Packing list

BlueHorizon
Cat. no.: BH-2C

No. of items	Description	Cat. no.
1	Electrophoresis unit	BH-2C
1	Instruction manual	

2. Specifications

- Rugged acrylic glass construction
- All acrylic glass joints are bonded by special glue
- Double insulated cables rated safe up to 1500 V, proof voltage up to 3000 V
- Gold plated plug connectors, corrosion-free
- Recessed power connectors integrated within the lid
- Electrodes made from synthetic carbon. Standard version with 2 electrodes (cat. no. BH-2C) fixed to the safety lid; 3-electrodes version optional by simple exchange of the lid (cat. no. BHL-3)
- Spring-mounted electrodes flexibly attached to the lid provide optimal and smooth contact to the gel surface
- Electrodes can be adjusted to different gel widths through recessed guideways by set screws
- High-performance ceramic cooling plate (glass-metal) for maximum gel size of 285 x 197 mm for homogeneous thermostating and even heat dissipation
- Ports for the connection to an external circulatory refrigeration system are located on the rear of the unit; **maximum pressure: 1 bar (14 psi)**
- Height adjustable ceramic cooling plate for different gel thicknesses within the range of 0.1 to 10 mm
- Ceramic cooling plate with imprinted grid for correct alignment of gel prior to run

3. Operating conditions

	BH-2C
Maximum voltage (Volt)	3000 V
Maximum current (mA)	15 Amp
Maximum gel size	285 x 197 mm
Maximum electrode distance	15.0 cm
Minimum electrode distance	5.0 cm

Environmental conditions :

- The electrophoresis chamber is intended for indoor use only.
- The normal operating range is between 4 °C and 30 °C (40 °F to 86 °F).
- We recommend: Maximum relative humidity up to 80 % for temperatures up to 30 °C (80 °F), decreasing linearly to 50 % relative humidity at temperatures up to 40 °C (104 °F) at maximum height of 2000 m sea level (NN).

Please note prior to initial operation:

To prevent any damage during transport the acrylic housing (tank and lid) and the cooling plate are packaged separately. After removal of the packaging material, insert the ceramic cooling plate in the bottom tank in such way that the bent, black plastic ports (connecting to a refrigerator circulatory bath or the water tap) feed into the slits (cut out in the bottom tank); let the cooling plate slide gently into the final position resting on the bottom of the tank.

4. Additional accessories (optional)

For three-point electrophoresis an exchange lid with 3 carbon electrodes can be ordered (cat. no. BHL-3). This lid can be used instead of the 2-electrode lid: the middle electrode is fixed to the lid, whereas the other 2 electrodes can be moved - as with the standard lid with 2 electrodes - and adjusted to the desired separation distance (same as the 2-electrode lid).

5. Operation of the unit

Important note: Responsibility will not be accepted by SERVA Electrophoresis GmbH for damage resulting from misuse and violation of the following conditions.

5.1. Safety precautions

- **Read** the instructions before using the apparatus.
- Always separate the electrophoresis chamber from the power supply **before removing the safety lid** (pull plugs).
- **Do not exceed** maximum operating voltage or current (see “specifications”)
- **Do not operate** the electrophoresis chamber in metal trays.

5.2. Care and maintenance of the device

- To remove the safety lid push down the plastic lugs with both thumbs and lift the lid vertically.
- Prior to use clean the ceramic cooling plate and the carbon electrodes with a paper tissue or cloth wetted with **distilled water**. **Do not use** scouring agents. Dry the parts with a clean tissue paper.
- After each run **clean** the bottom edges of the electrodes with tissue paper soaked with **distilled water**. We recommend the use of a rough sponge to clean the electrode surfaces approx. after every 10 applications. This is also advised every time the application is changed (in particular, from SDS-PAGE to IEF or native electrophoresis); traces of SDS buffer may be retained by the micropores of the carbon electrodes, which may interfere with native applications causing distortions in the separations.
- Ensure that the electrodes are clean and dry before storage of the chamber.
- Prior to use, and then at monthly intervals, check the unit for proper function. In case of malfunction **do not attempt to repair or use the apparatus**, but notify **SERVA Electrophoresis GmbH Heidelberg** resp. the **SERVA Electrophoresis** distributor immediately.

Chemical resistance of the synthetic carbon electrodes has been checked for:

acetone	methanol	higher alcohols
methylenechloride	benzine	perchloroethylene
benzene	mineral oils	trichloroethylene
	toluene	

5.3. Filling of the ceramic cooling plate with liquid

1. Place the chamber vertically onto the front side, so that the two ports to the ceramic cooling plate point upwards. Connect then the ports with the liquid source (water/circulating cooling water bath).
2. Continuously fill the ceramic cooling plate applying a medium flow rate (**do not exceed 1 bar = 14 psi**). Make sure that air bubbles will not be trapped, which may cause uneven heat dissipation.

5.4. Use of a circulating cooling water bath

1. Attach a short piece of a rubber or silicone tubing to each port at the back side of the chamber.
2. Connect one end of the rubber hose to the outlet port of the cooling water bath and the other end to the inlet port.
3. **Do not exceed maximum pressure of 1 bar (14 psi)**. Use a pressure gauge (manometer).
4. In case of connection to an external circulatory refrigeration system with a higher water pressure, you can use a T-connection, so that the water is distributed to 2 outlets (one port to the electrophoresis chamber, the other port leads back to the cooling device). The flow rate circulating through the ceramic cooling plate of the BlueHorizon unit can be further regulated using a tubing clamp. **Measure the water pressure and regulate to the needed rate before you attach the circulatory system to the BlueHorizon™ unit.** Be aware that exceeding the maximum flow rate may cause damage to the ceramic cooling plate.
5. You can use a mixture of water/anti-freeze reagent (e.g. polyethylene glycol) instead of plain water. However, the minimum cooling temperature of the ceramic cooling plate has to be set to at least 10 °C (50 °F).

5.5. Performance of horizontal electrophoresis

5.5.1. Recommended sample preparation for isoelectric focusing (IEF)

Adjust sample concentration to about 1 - 10 mg protein/ml and desalt

1. by dialysis; we recommend electro dialysis with simultaneous concentration.
2. by dilution with H₂O dest. and concentration with membrane filter.
3. by lyophilization (used for volatile buffer salts) and resuspension in H₂O dest.

5.5.2. Putting on a horizontal gel

1. **Adjust the ceramic cooling plate** corresponding to the thickness of the separating medium (gel plus electrode wicks). The plate can be flexibly adjusted to gel thicknesses ranging from 0.1 - 10 mm. Using a screw driver turn the set screws at the edges of the plate and adjust the height according to the proper distance of the electrodes to the gel surface; make sure that a slight pressure will result - this will ensure an even contact of electrodes to the gel surface which is important for efficient power transfer. The spring-mounted electrodes are flexibly attached to the lid and will provide optimal and smooth contact to the gel surface. However, when changing from thin (up to 0.3 mm) to thick gels (0.5 mm to 1 mm) and vice versa it is necessary to re-adjust the ceramic cooling plate. Lower or rise the level of the plate using the set screws. Thus, the risk of damaging thicker gels ("squeezing") is omitted as is poor performance due to incomplete contact of the lid or electrodes (which might result in an inhomogeneous field).
2. **Prechill the ceramic cooling plate** by switching on the circulatory system prior to run until the desired operating temperature of the ceramic cooling plate is reached.
3. Pipette **some drops of heat exchange liquid** (e.g. kerosene, cat. no. 26940) onto the ceramic cooling plate.
4. Position the gel onto the ceramic cooling plate by bringing the gel with one edge of the support film to the heat exchange liquid. After the liquid film has spread beneath this edge, lower the gel carefully and **slowly**. Make sure that air bubbles will not be trapped, which may cause uneven heat dissipation/cooling of the gel.
5. Place the electrode wicks soaked with anode resp. cathode buffer onto the gel. Wicks must not extend beyond edge of gel but be aligned parallel to each other and corresponding to where the electrodes will be placed.
6. Place an applicator strip onto the gel for application of samples.
7. Centrifuge the samples for 5 minutes at approx. 12,000 g; use only the supernatant. By omitting this step the separation pattern might become fuzzy and, eventually, precipitates may form within the applicator strip slots. (**please refer to 5.5.1.:** sample preparation for IEF).
8. Apply the required sample volume using a pipette. For IEF, do not leave empty slots between samples; we recommend to apply a marker protein mixture (e.g. IEF marker 3-10, SERVA Liquid Mix, cat. no. 39212) to avoid margin effects.
9. Close the safety lid but yet avoid contact of the electrodes with the wicks. **Position the electrodes over the wicks:** loosen the screws inserted into the lid and move the electrodes along the guidances in the lid until they are positioned over the electrode wicks. Fix the electrodes at desired positions by tightening the screws. Finally, push the lid down to the limit stop to provide full contact.
10. Connect the unit to the power supply (e.g. SERVA BluePower 3000, cat. no. BP-3000). Before switching on the power supply set all parameters to "0". Then set the parameters as required for the electrophoresis run.

Attention : Do **not exceed** the maximum voltage and (or) current values to avoid damage to the instrument.

5.5.3. Standard focusing program using IEF polyacrylamide gels
(e.g. SERVALYT™ PRECOTES™ 3-10)

Limits	Initial voltage	150 - 250 V*
	Final voltage	2000 V*
	Cooling	4 °C (39.2 °F)
End	Final Vh Run time	2500 Vh ca. 3 hours

*the corresponding wattage should have double the value of the current

Gel size	Gel thickness	mA	W	Final voltage (V)
125 x 125 mm	150 µm	4	8	2000
245 x 125 mm	150 µm	8	16	2000
125 x 125 mm	300 µm	7	14	2000
245 x 125 mm	300 µm	14	28	2000

5.5.4. Guidelines for standard IEF using agarose gels

1 % agarose gel, 0.4 - 0.5 mm thickness, 4 % SERVALYT™ 3-10, size 10 x 10 cm

Limits	Current	15 mA
	Power	10 W
	Cooling	10 °C(50 °F)
End	Voltage	600 V
	Time	ca. 60 min.

5.6. End of run

1. Set all parameters of the power supply to "0" and then switch off. Interrupt all electrical connections to the Blue Horizon™ unit.
2. Remove the safety lid by pressing down the plastic bar with one thumb and simultaneously lifting the lid with the other hand.
3. Lift up the gel sheet from the ceramic cooling plate using forceps.
4. Clean the ceramic cooling plate and carbon electrodes with a tissue paper soaked in distilled water. **Do not** use scouring agents or rough sponges for purification. Before storage of the unit be sure all connections to be clean and dry.
5. After the run the IEF gel is fixed with 20 % (w/v) TCA (trichloroacetic acid, SERVA cat.no. 36910). For staining we recommend to use SERVA Violet 17 (SERVA cat.no. 35072 – powder, cat.no. 35074 - staining kit), SERVA Blue W (cat. no. 35053) or SERVA silver staining kit for native PAGE (cat. No. 35077).

6. Recommended reagents for horizontal electrophoresis

SERVA Electrophoresis GmbH recommends the range of SERVA reagents for electrophoresis, which are subject to stringent quality and application control procedures - a guarantee for constant resolution and separating performances.

Product	Cat. no.
GEL-FIX™ for PAG, 245 x 125 mm, 36 sheets	42980.01
GEL-FIX™ for PAG, 260 x 125 mm, 36 sheets	42999.01
GEL-FIX™ for PAG, 260 x 203 mm, 36 sheets	42961.01
GEL-FIX™ for PAG, 265 x 125 mm, 36 sheets	42993.01
GEL-FIX™ for PAG, 265 x 193 mm, 36 sheets	42983.01
GEL-FIX™ for PAG, 265 x 213 mm, 36 sheets	42939.01
GEL-FIX™ for PAG, 50 m x 125 mm, 1 roll	42966.01
GEL-FIX™ for PAG, 50 m x 193 mm, 1 roll	42968.01
GEL-FIX™ for PAG, 50 m x 233 mm, 1 roll	42934.01
GEL-FIX™ for PAG, 200 m x 193 mm, 1 roll	42996.01
GEL-FIX™ for Agarose* GEL-FIX™ Covers*	Refer to main catalogue
NetFix™ for PAG* NetFix™ for Agarose*	Refer to main catalogue
Acrylamid -Bis Solution, 29:1 (40 % w/v) 3.3 %C	10680
Acrylamid-Bis Solution, 37.5:1 (40 % w/v) 2.6 %C	10681
Additional ready-to-use solutions and acrylamide as well as N,N'-methylene-bisacrylamide as powder	Refer to main catalogue
Ammonium persulfate	13375
N,N,N',N'-Tetramethyl-ethylenediamine	35925
SERVALYT™ 2-4	42902
SERVALYT™ 2-11	42900
SERVALYT™ 2-9 Seed-Mix	42935
SERVALYT™ 3-4	42922
SERVALYT™ 3-5	42903
SERVALYT™ 3-6	42944
SERVALYT™ 3-7	42945
SERVALYT™ 3-10	42940
SERVALYT™ 3-10 Iso-Dalt, for 2D	42951
SERVALYT™ 4-5	42923
SERVALYT™ 4-6	42904
SERVALYT™ 4-7	42948
SERVALYT™ 5-6	42924
SERVALYT™ 5-7	42905
SERVALYT™ 5-7 PGM	42936
SERVALYT™ 5-8	42949
SERVALYT™ 5-9	42950
SERVALYT™ 6-7	42925
SERVALYT™ 6-8	42906
SERVALYT™ 6-9	42913
SERVALYT™ 7-9	42907
SERVALYT™ 9-11	42909
SERVALYT™ 4-9 T	42910
SERVALYT™ PRECOTES™ 3-10, 150 µm, 125 x 125 mm	42965
SERVALYT™ PRECOTES™ 3-10, 150 µm, 245 x 125 mm	42967
SERVALYT™ PRECOTES™ 3-10, 300 µm, 125 x 125 mm	42866

Product	Cat. no.
SERVALYT™ PRECOTES™ 3-10, 300 µm, 245 x 125 mm	42867
SERVALYT™ PRECOTES™ 3-10, 150 µm, 45 x 50 mm	42881
SERVALYT™ PRECOTES™ 3-6, 150 µm, 125 x 125 mm	42974
SERVALYT™ PRECOTES™ 3-6, 150 µm, 245 x 125 mm	42919
SERVALYT™ PRECOTES™ 3-6, 300 µm, 125 x 125 mm	42874
SERVALYT™ PRECOTES™ 4-6, 150 µm, 125 x 125 mm	42975
SERVALYT™ PRECOTES™ 4-6, 150 µm, 245 x 125 mm	42942
SERVALYT™ PRECOTES™ 4-6, 300 µm, 125 x 125 mm	42875
SERVALYT™ PRECOTES™ 5-7, 150 µm, 125 x 125 mm	42979
SERVALYT™ PRECOTES™ 5-7, 150 µm, 245 x 125 mm	42946
SERVALYT™ PRECOTES™ 5-7, 300 µm, 125 x 125 mm	42879
SERVALYT™ PRECOTES™ 6-9, 150 µm, 125 x 125 mm	42978
SERVALYT™ PRECOTES™ 6-9, 150 µm, 245 x 125 mm	42954
SERVALYT™ PRECOTES™ 6-9, 300 µm, 125 x 125 mm	42878
Blank PRECOTES™, 125 x 125 mm, 5 pcs.	42759
Blank PRECOTES™, 245 x 125 mm, 5 pcs.	42710
Blank PRECOTES™, 45 x 50 mm, 5 pcs.	42711
Blank PreNets™, 125 x 125 mm, 5pcs.	42758
Blank PreNets™, 245 x 125 mm, 5pcs.	42718
SDS PreNets™ Blotting Kit, 125 x 125 mm, 5 gels	42700
SDS PreNets™ Blotting Kit, 245 x 125 mm, 5 gels	42701
Anode fluid 3 for IEF, 50 ml	42984
Cathode fluid 10 for IEF, 50 ml	42986
Electrode wicks extra size, 300 x 6 x 1 mm, 100 pcs.	42972
Electrode wicks long size, 240 x 6 x 1 mm, 100 pcs.	42987
Electrode wicks standard size, 120 x 6 x 1 mm, 100 pcs.	42988
Applicator strips 7 x 1 (24 slots, 100 mm long), 3 pcs.	42989
Applicator strips 3.5 x 2 (15 slots, 260 mm long), 6 pcs.	42915
Applicator strips 2 x 3.5 (19 slots, 100 mm long), 6 pcs.	42914
Applicator strips 3.5 x 2 (43 slots, 240 mm long), 3 pcs.	42899
Applicator strips kit	42937
Bayol F, 100 ml	14500
Kerosene, 1 l	26940
Agarose SERVA without EEO	11401
Agarose SERVA neutral for IEF	11402
IEF sample buffer (2x), 20 ml	42537
IEF Marker 3-10, SERVA Liquid Mix	39212
Protein test mixture for pI-determination, pH 3-10 (lyophil.)	39211
SERVA Violet 17 (Pulverform)	35072
SERVA Violet 17 staining kit	35074
SERVA Blue W (Pulverform)	35053
SERVA silver staining kit for native PAGE	35077
Trichloroacetic acid. 20 % solution	36913

*The above mentioned SERVA products represent only a small section of the most commonly used products. A comprehensive range of SERVA products for electrophoresis is available listed in the **SERVA Electrophoresis** main catalogue. Please inquire.