A M E R S H A M P H A R M A C I A B I O T E C H

Hoefer® HE 99X Max™

Submarine Electrophoresis Unit

User Manual

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80-6067-53 HE99X-IM/Rev H1/3-97

amersham pharmacia biotech

Important user information

English

Please read this entire manual to fully understand the safe and effective use of this product.

The exclamation mark within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the instrument.

The lightning symbol within an equilateral triangle is intended to alert the user to the risk of exposure to high voltages.

Should you have any comments on this manual, we will be pleased to receive them via email at ts-ep@am.apbiotech.com or at:

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Français

Pour une bonne compréhension et une utilisation en sécurité maximale, il convient de lire entièrement ce manuel.

Dans la documentation qui accompagne l'instrument un point d'exclamation dans un triangle équilatéral a pour but d'attirer l'attention de l'utilisateur sur des instructions importantes de fonctionnement ou de maintenance.

Le symbole de l'éclair dans un triangle équilatéral a pour objet d'attirer l'attention de l'utilisateur sur un danger d'exposition à la haute tension.

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Información importante para el usuario

Español

Para comprender el producto y utilizarlo con seguridad es necesario leer este manual en su totalidad.

El signo de admiración en un triángulo equilátero en el manual, advierte al usuario sobre la presencia de instrucciones importantes de operación y mantenimiento del aparato.

El símbolo del rayo en un triángulo equilátero alerta al usuario sobre el riesgo de exposición a altas tensiones.

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Informazioni importanti per l'operatore

Italiano

Per un utilizzo sicuro del prodotto, leggere attentamente l'intero contenuto del presente manuale.

Il punto esclamativo all'interno di un triangolo equilatero indica all'operatore la presenza di importanti istruzioni di funzionamento e manutenzione nella documentazione allegata al prodotto.

Il simbolo del fulmine all'interno di un triangolo equilatero indica all'utente la presenza di un rischio di esposizione ad alte tensioni.

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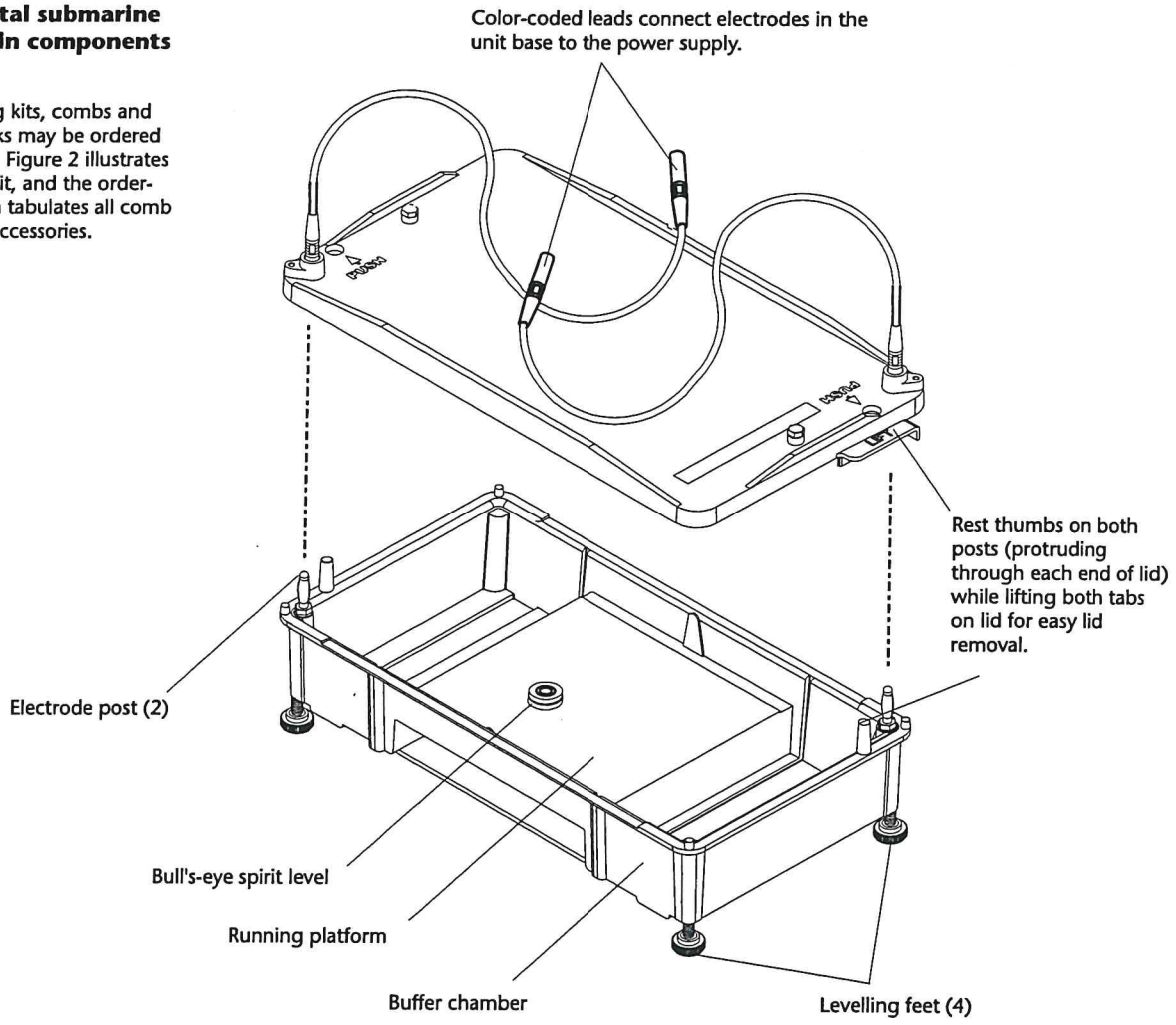
1 Submarine Electrophoresis Unit Function and Description

The Hoefer HE 99X Max™ unit electrophoretically separates nucleic acid fragments in a submarine gel. The gel is first cast in a gel caster, which is available in three lengths. (The longer 15 and 20 cm trays can hold one or two combs.) Once the gel sets, the running tray is transferred to the platform of the electrophoresis unit, and the gel is submerged under running buffer.

Figure 1.
Horizontal submarine unit main components

Gel casting kits, combs and comb backs may be ordered separately; Figure 2 illustrates a casting kit, and the ordering section tabulates all comb sizes and accessories.



Unpacking

Unwrap all packages carefully and compare contents with the packing list, making sure all items arrived. If any part is missing, contact your local Amersham Pharmacia Biotech sales office. Inspect all components for damage that may have occurred while the unit was in transit. If any part appears damaged, contact the carrier immediately. Be sure to keep all packing material for damage claims or to use should it become necessary to return the unit.

Specifications

Max. voltage	200 V⎓
Max. wattage	20 W
Max. amperage	100 mA
Max. operating temperature	45 °C
Max. buffer volume	1.2 liters
Gel size	15 cm wide × 10, 15, or 20 cm long
Environmental operating conditions	Indoor use: 4–40 °C Humidity up to 80% Altitude up to 2000 m
Installation category	II
Pollution degree	2
Dimensions (w x l x d) (includes electrode posts)	18.2×36×14 cm (7.2×14.2×5.5 in.)
Weight (base, lid, and leads only)	0.82 kg (1.8 lb)
Product certifications	EN61010–1, UL3101–1, CSA C22.2 1010.1, CE

This declaration of conformity is only valid for the instrument when it is:

- used in laboratory locations,
- used as delivered from Amersham Pharmacia Biotech except for alterations described in the User Manual, and
- connected to other CE labeled instruments or products recommended or approved by Amersham Pharmacia Biotech.

Important information

- The safety lid must be in place before connecting the power leads to a power supply.
- Turn all power supply controls off and disconnect the power leads before removing the safety lid.

- Do not allow the operating temperature to exceed 45 °C. All plastic parts are rated for 45 °C continuous duty. For longer runs you can control heating somewhat by chilling the buffer before use, running the unit in a cold room, or both. Overheating will cause irreparable damage to the unit!

- Cool the agarose to 50 °C before pouring into the casting kit or horizontal unit to prevent plastic parts from warping.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Only accessories and parts approved or supplied by Amersham Pharmacia Biotech may be used for operating, maintaining, and servicing this product.

Informations importantes

- Le couvercle de sécurité doit être en place avant de brancher les prises au générateur.
- Eteindre le générateur et débrancher les prises avant d'enlever le couvercle de sécurité.

- Ne pas utiliser à une température au dessus de 45 °C. Toutes les piéces en plastique sont prévues pour résister à une température constante de 45 °C. Pour des coulages plus long, on peut aussi contrôler la température en refroidissant le tampon avant l'utilisation et/ou en utilisant l'instrument dans une chambre froide. Un surchauffement peut causer des dommages irréparables à l'instrument.
- Refroidir l'agarose entre 50 °C avant de la verser dans l'unité de moulage ou dans le module horizontal afin d'éviter que les piéces en plastique ne se déforment.
- Si l'instrument n'est pas utilisé en conformité avec les recommandations du fabriquant, les protections de sécurité qui équipent cet appareil peuvent être rendues inéfficaces.
- Seulement les accessoires et piéces detachées approuvés ou fournis par Amersham Pharmacia Biotech sont recommandés pour l'utilisation, l'entretien et réparation de cet appareil.

2 Operating Instructions

Agarose gels are first cast in the gel casting kit, and samples are then loaded into the wells and electrophoretically separated. The fluorescent dye ethidium bromide can be added to the gel or electrophoresis buffer or both in order to track separation progress. At the completion of electrophoresis, the gel may be stained and photographed, blot transferred, or dried for autoradiography.

Before you start. . .

1 Wash all components with a dilute solution of laboratory detergent and rinse thoroughly.

2 Level the unit by placing the spirit level on the running platform and adjusting the levelling feet.

Casting the gel

Prepare the solutions

1 **Prepare about 1.3 liters of running buffer.** Up to 100 ml of buffer is required for the gel and 1.2 liters for the buffer chamber. Refer to p. 11 for recipes of three commonly used electrophoretic running buffers.

2 **Prepare the sample loading buffer.** Refer to page 12 for a recipe and tabulated volume capacity for each comb size.

3 **Prepare agarose solution(s).**

Dissolve agarose in running buffer, heat according to instructions accompanying the agarose, and allow the solution to cool to 50 °C before pouring into the running tray.

Volume for 3-mm thick gels	
Tray size (cm)	Agarose (ml)
10 x 15	45
15 x 15	68
15 x 20	90

Caution!

Ethidium bromide is a known mutagen. Always wear gloves when handling.

Optional: Add 0.5 µg/ml ethidium bromide to the gel solution in order to facilitate observation of separation progress during electrophoresis.

Note

Grooves in the running tray create ridges at both ends of the gel to prevent it from slipping or floating. If these ridges are not desired, either tape over the grooves before casting, or trim off ridges with a spatula after the run.

Prepare the casting tray and pour the gel

1 **Install a foam pad at each end of the casting tray.** Use a comb as a placement guide so that the pad adheres ≈1 mm from the bottom of the tray: Lay the comb into the bottom of the tray, oriented so that it fits completely across the tray along the side that is 16 cm wide. Peel off the adhesive backing on the foam pad, align the pad on the comb, adhesive side toward the inside wall of the tray, and slide the comb against the wall. Press the foam pad in place and repeat with second pad on the wall opposite the first pad.

2 Seat the running tray between the foam pads in the casting tray by placing one end of the tray against the foam pad, slightly compressing it, then seating the other end of the tray against the opposite foam pad. (See arrows A and B in Figure 2.) The running tray should lay flush against the bottom of the casting tray.

3 Place the casting tray assembly on a leveling surface and level, using the spirit level on the running tray as a guide. Check that the comb assembly will allow ≈1 mm of space between the comb bottom and the running tray. Remove the level and the comb assembly.

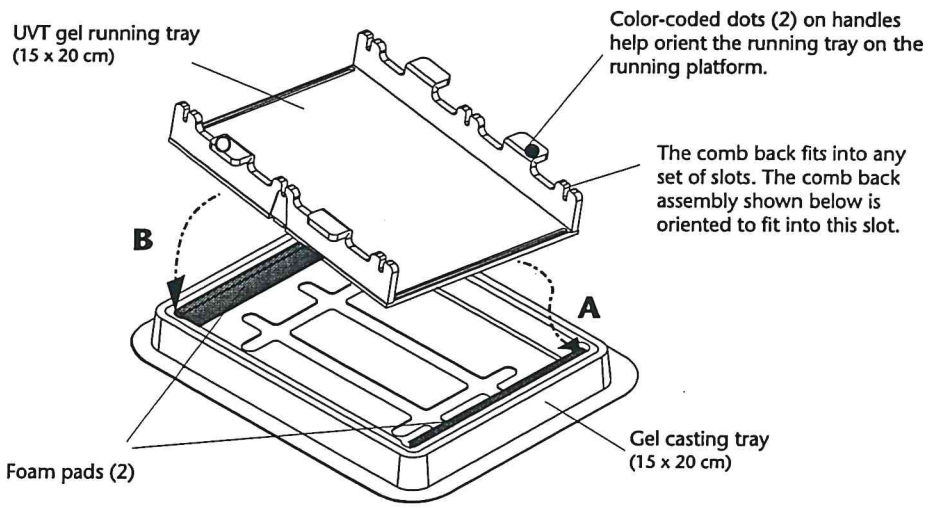


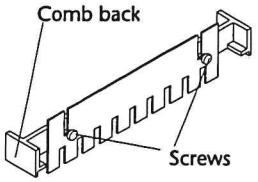
Figure 2.
Gel casting kit

Running tray installation: Approach the foam pad with one end of the running tray (Arrow A) and then gently press the tray edge against the pad, compressing it enough to allow the opposite end of the running tray to drop fully into the casting tray (Arrow B) before sealing against the foam pad.

Prepare the combs

1 Align the two slots in the comb with the loosened thumb screws of the comb back. Tighten the screws until the comb is just supported.

2 Place the comb assembly into a set of slots on the running tray seated in the casting tray. Adjust the comb so that the bottom of the teeth are ≈1.0 mm from the running tray. Tighten the screws to secure the comb.



To run twice as many samples on the 15 and 20 cm trays, prepare two comb assemblies and place one near the cathode end, indicated by the black dot, and one at the center.

Final casting steps

1 Pour the agarose solution (cooled to 50 °C) onto the running tray seated in the casting tray. Orient the comb assembly so that it is at the end of the tray opposite the direction of migration (typically at the cathode [–] end, which is marked by a black dot on the handle). Fit the comb assembly into the slots.

2 Allow a minimum of ½ hour for the gel to set, then remove the comb carefully: partially lift and slightly tilt the comb at one end and slowly withdraw it from the gel. (Pulling the comb straight up creates a vacuum in the wells that may lift the gel out of the tray.)

3 Lift the running tray out of the casting tray and transfer it with the gel to the horizontal unit. Orient the running platform so that the sample will "run to red." That is, place the sample wells at the cathode (–) end, which is indicated by a black dot. A notch on either side of the running tray centers the tray on the running platform.

Preparing for electrophoresis

Refer to the Buffers, Volumes, and Notes section for additional information and guidelines.

Caution

Wear UV safety goggles and protect skin when using a UV lamp.

1 **Optional:** To monitor separation progress, either add 0.5 µg/ml (final conc.) of ethidium bromide to the running buffer now, or, add 50 µg/ml (final conc.) ethidium bromide to the sample buffer. To visualize progress, turn off the power supply, remove the lid assembly, and hold a portable UV lamp near the gel. Note: Adding ethidium bromide to the running or sample buffer slows migration slightly. Detection by this method is not as sensitive as staining and viewing on a transilluminator. See the DNA detection section, p. 14, for more details.

2 Fill the chamber with buffer until the gel is submerged ≈1 mm.

Note

See page 11 for a sample loading buffer recipe and well volumes for various comb sizes in gels of different thicknesses.

3 **Load the samples.** Add the sample to 5X sample loading buffer (1/5 of the final volume is loading buffer, see p. 12). Mix each sample and load into a well with a micro-pipet, taking care to avoid puncturing the well bottom or entrapping bubbles.

4 Place the lid on the unit so that the cathode (black lead) is at the end nearest the samples. (Nucleic acid samples migrate toward the anode.)

5 Connect the color-coded leads (red to red, and black to black) to an approved power supply such as the Hoefer SX 250 or EPS 2A200. Set the voltage and timer (if available.) Agarose gels are typically run at constant voltage under a voltage gradient in the range of 2–5 V/cm. The distance between the electrodes is ≈26 cm, so a setting of 127 V results in a gradient of 5 V/cm.

Important: If running two sets of samples in one gel, monitor the run closely and stop electrophoresis when the marker dye approaches the wells in the center.

After electrophoresis

1 **Important:** Always turn off the power supply and disconnect the leads before removing the lid.

2 If no ethidium bromide was added to the gel or sample before the run, stain the gel now in a solution of 0.5 to 1.0 µg/ml ethidium bromide in water or buffer.

3 Clean the unit as described in the next section.

3 Care and Maintenance

Cleaning

- Never autoclave or heat any component above 45 °C.
- Never use abrasive cleansers.
- Do not expose the unit to solutions or vapors of aromatic or halogenated hydrocarbons, ketones, esters, alcohols (over 30%), or concentrated acids (over 25%).

The unit is resistant to all common electrophoresis buffers, but we recommend a thorough washing with a mild detergent after each use. Rinse with distilled water and allow to air dry.

To remove DNase and RNase contamination, fill the unit with 3% hydrogen peroxide (H_2O_2), soak for 10 minutes, then rinse thoroughly with DEPC-treated, autoclaved, deionized water. (Sambrook, *et al.* 1:7:40)

Replacing the electrode

If an electrode breaks, replace it with a 25 cm (10") length of 0.25 mm (0.01") diameter platinum wire as follows:

1 Release one end of the platinum electrode by loosening the banana plug. (Notice that the wire lies between the nylon and metal washers.)

2 Carefully pry loose both nylon buttons on the electrode shield with a blunt edge such as a screwdriver. Once the buttons are removed, slip off the Teflon tubing from the electrode and pull the electrode loose from the far end of the shield. (Save the buttons and Teflon tubing.)

3 Form a loop (≈6 mm in dia.) at one end of the new platinum wire and anchor the loose end by twisting it around the wire. (The end of a pencil is a useful aid in forming the loop.) Fit the loop onto the button stem and press the button into the hole at the end furthest from the banana plug.

4 Guide the wire along the groove in the shield, and with the second button stem straddling the wire, press the button into the hole closest to the banana plug.

5 Slip the Teflon tubing over the wire and route the wire up the ramp to the banana plug. Gently tug the wire so that it is just taut and then **fit the wire between the nylon and metal washers.** (Do not wrap around the banana plug.) Secure the wire by tightening the banana plug no more than 1/8 turn past snug. Trim wire if necessary.

Note

Handle platinum wire as little as possible and with great care to avoid breakage.

To avoid stressing the wire, do not wrap it around the banana plug; fit it between the metal and nylon washers.

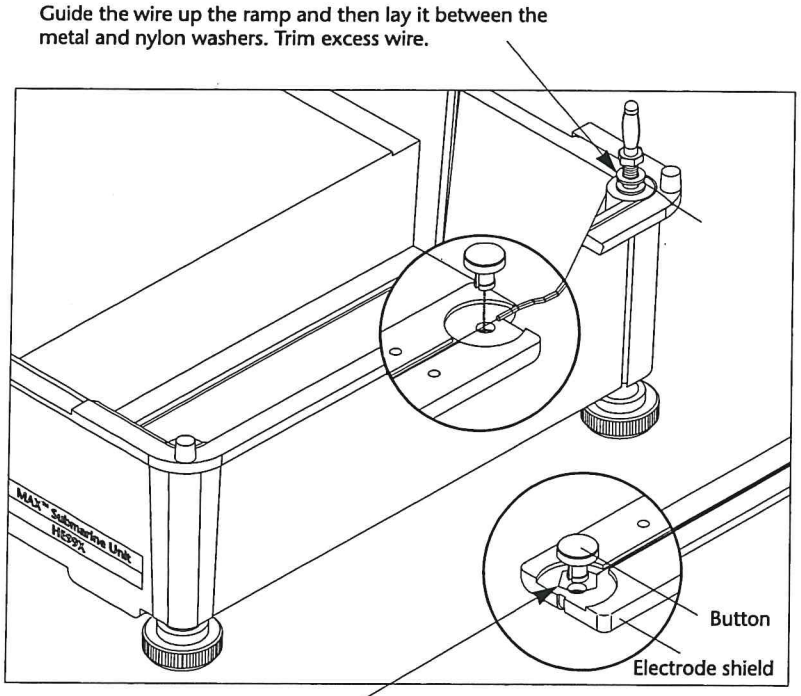


Figure 4 Replacing the electrode

Pull up both buttons on the electrode shield, release the damaged electrode, and install a new length of platinum wire.

4 Troubleshooting

Sample well deformed

- ✓ Allow the gel to set for a minimum of 1 hour and make sure it is at room temperature before removing the comb.
- ✓ Remove the comb at a slight angle and very slowly to prevent the gel from breaking.
- ✓ Take care to not damage the well with the pipet while loading the sample; aim for the center of the well and do not puncture the bottom with the pipet tip.

Samples not running along a straight path

- ✓ If the comb is warped, replace.
- ✓ If the running tray is warped, replace. (Cool agarose to 50 °C to prevent the tray from warping.)
- ✓ Circulate buffer if it becomes depleted by stopping the run and pipetting the buffer from one chamber to the other.

Double-banded pattern

- ✓ Make sure the comb remains vertical after the gel is cast so that the well shape is not distorted.
- ✓ Decrease the buffer level to 1 mm above the top of the gel in order to reduce the temperature gradient in the gel.

Poor band resolution

- ✓ Add Ficoll, glycerol, or sucrose to the sample loading buffer to ensure that the sample sinks to the bottom of the well. (Ficoll is the recommended agent.)
- ✓ Make sure the sample is completely dissolved.
- ✓ Reduce the voltage.
- ✓ Reduce the sample concentration.
- ✓ Reduce the sample volume.
- ✓ Reduce voltage to ≤5V/cm.
- ✓ Be sure the well floor is at least 1 mm thick to prevent samples from leaking through the bottom.
- ✓ Reduce the salt concentration of the sample.
- ✓ Check enzyme activity; the sample may require longer digestion or a different restriction buffer.
- ✓ Prepare fresh sample if you suspect nuclease contamination.
- ✓ Choose agarose with a low endosmosis value.

Foam pads peel off

- ✓ Do not press the running tray into place. Install as described on page 5.

5 Buffers, Volumes, and Notes

Running buffers for DNA in agarose gels

Recipes for the three most commonly used running buffers for DNA electrophoresis are listed below. The buffering capacity of both TBE and TPE is usually sufficient so that buffer circulation is unnecessary. Circulation may be required during runs longer than 3 hours or when using the TAE buffer.

Important

Do not adjust the pH of these buffers once they are prepared according to the recipe!

1 10X Tris-borate-EDTA (TBE) stock buffer[a]

(0.89 M Tris, 0.89 M boric acid, 20 mM EDTA, pH ≈8.2, 1000 ml)

Tris base (FW 121.1)	0.89 M	108.0 g
Boric acid (FW 61.8)	0.89 M	55.0 g
EDTA solution (0.5 M, pH 8.0, soln. 4)	0.02 M	40.0 ml
Deionized H_2O		to 1000.0 ml

Stir. Do not adjust pH.

BEFORE USE DILUTE EITHER TO:

0.5X, to yield 45 mM Tris base, 45 mM boric acid, and 1 mM EDTA. This dilution is often used because current remains low, resulting in less heat.

—OR—

1X, to yield 89 mM Tris base, 89 mM boric acid, and 2 mM EDTA.

2 10X Tris-phosphate-EDTA (TPE) stock buffer[a]

(0.89 M Tris, 0.89 M phosphoric acid, 20 mM EDTA, pH ≈8.1, 1000 ml)

Tris base (FW 121.1)	0.89 M	108.0 g
Phosphoric acid (85%)	0.23 M	15.5 ml
EDTA solution (0.5 M, pH 8.0, soln. 4)	0.02 M	40.0 ml
Deionized H_2O		to 1000.0 ml

Stir. Do not adjust pH.

Dilute to 1X, to yield 89 mM Tris base, 23 mM phosphoric acid, and 2 mM EDTA.

3 10X Tris-acetate-EDTA (TAE) stock buffer[a]

(0.4 M Tris, 0.2 M acetic acid, 10 mM EDTA, pH ≈8.4, 1000 ml)

Tris base (FW 121.1)	0.40 M	48.4 g
Acetic acid (99.5%)	0.20 M	11.4 ml
EDTA solution (0.5 M, pH 8.0, soln. 3)	0.01 M	20.0 ml
Deionized H_2O		to 1000.0 ml

Stir. Do not adjust pH. Dilute to 1X before use to yield 40 mM Tris base, 20 mM acetic acid, and 1 mM EDTA.

4 EDTA solution (ethylenediamine tetraacetic acid)[b]

(0.5 M, pH 8.0, 100 ml)

$Na_2EDTA{\cdot}2H_2O$, (FW 372.2)	0.5 M	18.6 g
Deionized H_2O		to 70.0 ml
NaOH (10 M) to pH 8.0		≈5.0 ml
Deionized H_2O		to 100.0 ml

[a]Sambrook, J. (1989) *Molecular Cloning: A Laboratory Manual*, B.23

[b]Current Protocols in Molecular Biology (1993) A.2.1

Loading buffer and sample volumes

Loading buffer

(5X, 25% Ficoll 400, 0.25% Bromphenol blue†, 10 ml)

Deionized H_2O	to 7.0 ml
Ficoll®400 (Amersham Pharmacia Biotech)	2.5 g
Bromphenol blue (FW 691.9)	25.0 mg
Deionized H_2O	to 10.0 ml

Add to sample in proportion so that 1/5 of the final volume is loading buffer.
(Loading buffer increases solution density.)

Note 1 Sucrose or glycerol may be used instead of Ficoll 400.

Note 2 Xylene cyanol (0.25%), which migrates more slowly than bromophenol blue, can be added as an additional marker if desired. The agarose concentration determines the position of the dye bands relative to a polynucleotide.

†Tracking dyes may be omitted to eliminate obscuring or dragging effects caused by comigration with smaller nucleic acids.

Comb specifications and sample volume required.

Code No.	no. of wells	well width (mm)	well thickness (mm)	sample vol. per 1 mm depth (µl)
80-6057-39	1/2	113/10	1.0	114/9.70*
80-6057-58	1/2	113/10	1.5	171/14.50*
80-6057-77	1/2	113/10	3.0	342/29.00*
80-6055-68	10	9.7	1.5	14.50
80-6055-87	10	9.7	3.0	30.00
80-6056-06	15	7.1	1.0	7.10
80-6056-25	15	7.1	1.5	10.60
80-6056-44	15	7.1	3.0	21.30
80-6056-63	20	4.7	1.0	4.70
80-6056-82	20	4.7	1.5	7.10
80-6057-01	20	4.7	3.0	14.20
80-6057-20	30	3.0	1.0	3.00

*Preparative combs form two reference wells (for MW standards), one on each side of the preparative well. The first number is sample volume/mm depth in the preparative well; the second is volume/mm in the reference well.

Agarose gel electrophoresis notes

Agarose gel electrophoresis can be used to separate DNA fragments down to 0.1 kb or less. Polyacrylamide gels are typically used for fragments smaller than 1 kb.

DNA mobility

The suggested agarose concentration for separating fragments of various sizes is listed below. Other factors affecting separation results include the selected running buffer, the voltage setting, the temperature, and the presence of ethidium bromide.

Agarose concentrations for separating DNA fragments of various sizes

Agarose (%)	Effective range of resolution of linear DNA fragments (kb)†
0.5	1 to 30
0.7	0.8 to 12
1.0	0.5 to 10
1.2	0.4 to 7
1.5	0.2 to 3

†Current Protocols in Molecular Biology, p 2.5.2 (1993).

A common standard is a *Hind* III digest of lambda phage, which gives eight fragments ranging in size from 0.1 to 23 kb. The bands are well resolved when run 2 hours on a 20 cm long 1% agarose gel in 0.5X TBE gel at 150 V.

RNA mobility

RNA can also be separated on the basis of size. To avoid irregularities due to secondary structure, RNA is denatured either before or during electrophoresis. For example, RNA fragments previously denatured with glyoxal and dimethylsulfoxide can be separated on neutral agarose gels, or RNA can be fractionated on agarose gels containing methylmercuric hydroxide or formaldehyde.

Note

RNA samples usually require longer runs or buffers that are easily depleted, so it is necessary to circulate the buffer.

For an example of RNA electrophoresis, request Hoefer Technical Bulletin #137, Low Formaldehyde Denaturing RNA Gel Electrophoresis: Protocol for Northern Blotting with the TE 80 TransVac™ Vacuum Transfer Unit.

DNA detection

DNA can be detected either by the fluorescence of bound ethidium bromide or by autoradiography of radio-labeled DNA.

Caution

Ethidium bromide is a known mutagen. Always wear gloves when handling.

Ethidium bromide (0.5 µg/ml) can be added to running buffer to monitor sample progress because the dye's fluorescence reveals DNA under UV light. (To check band location, turn off the power supply and remove the lid of the agarose unit. Hold a portable UV lamp near the running tray. Replace the lid and turn on the power again to resume electrophoresis.)

Caution

Wear UV safety goggles and protect skin when using any UV light source.

Alternatively, after electrophoresis, stain the gel in an ethidium bromide solution (0.5 µg/ml H_2O) for 15 to 60 minutes and then view or photograph the sample on a UV transilluminator. **Note:** Minimize the staining time to prevent small nucleic acid fragments from diffusing out of the gel.

Note

Ethidium bromide slows DNA migration by ≈15%.

To photograph the gel, either place the running tray on the transilluminator surface or slide the gel onto the surface for maximum exposure. The running tray is 95% transparent to 302 nm light and 40% transparent to 254 nm light. If you place the gel on the transilluminator, ensure that it lies flat by cutting off the ridges formed by the grooves in the running tray. (Do not damage the transilluminator surface; trim both ends of the gel with a spatula while it is still in the tray, lift away the ridges, and then slide the gel onto the transilluminator.) For viewing, 302 nm light is recommended for both acceptable sensitivity and reduced photoknicking.

To reduce the background fluorescence of unbound ethidium bromide, the gel can be destained by soaking it for 5 minutes in 0.01 M $MgCl_2$, or for 1 hour in 0.001 M $MgSO_4$. Destaining makes it easier to detect small quantities (less than 10 ng) of DNA. (Sambrook, 6.15)

Transfer

Before transfer, trim off the ridges at both ends of the gel to ensure even gel contact with the membrane.

References

Ausubel, *et al.*, (eds). *Current Protocols in Molecular Biology.* Greene Publishing and Wiley-Interscience. New York (1993).

Sambrook, J., Fritsch, E.F., and Maniatis, T. *Molecular Cloning: A Laboratory Manual.* Cold Spring Harbor Laboratory Press. (1989).

Customer Service Information

Technical Service and Repair

Amersham Pharmacia Biotech offers complete technical support for all our products. If you have any questions about how to use this product, or would like to arrange to repair it, please call or fax your local Amersham Pharmacia Biotech representative.

Important: Request a copy of the Amersham Pharmacia Biotech "Health and Safety Declaration" Form before returning the item. No items can be accepted for servicing or return unless this form is properly completed.

Ordering Information

	Qty.	Code No.
Max Horizontal Agarose Submarine Unit, complete. Includes basic unit, 15 x 20 cm gel casting kit, one 1.5 mm-thick 15-well comb, and comb backs, and spirit level.	1	80-6061-57
Max Horizontal Agarose Submarine Unit, basic. (Order gel casting kit, comb and comb back separately.)	1	80-6061-38
Accessories and replacement parts		
Buffer chamber assembly only	1	80-6054-16
Comb back for HE 99X comb with 2 screws	1	80-6054-35
Lid with power cables	1	80-6060-43
High voltage leads, set	1	80-6177-09
User manual	1	80-6067-53
Mylar sealing tape (1 roll)	1	80-6124-65
Platinum electrode wire (specify 25 cm)	1	80-6173-86
Foam sealing gaskets	4	80-6061-19
Levelling foot	4	80-6316-74
Agarose dam	2	80-6058-72
Reagents		
Ethidium bromide	10 ml	17-1328-01
Agarose, NA	100 g	17-0554-02
Agarose, prep	50 g	80-1130-07
Ficoll 400	100 g	17-0400-01
Bromophenol Blue	10 g	17-1329-01
Tris	500 g	17-1321-01
EDTA, disodium salt	100 g	17-1324-01
Boric acid	500 g	17-1322-01
Companion products		
EPS 200 power supply	1	19-0200-00
ImageMaster VDS		
DU 115 V~, 60 Hz	1	80-6246-82
DE 230 V~, 50 Hz	1	80-6247-01
DJ 100 V~, 50/60 Hz	1	80-6247-20
MacroVue UV-20 Transilluminator		
115 V~	1	80-6245-11
230 V~	1	80-6245-30

HE 99X gel casting kits

Each size includes 1 gel casting tray, 1 UVT running tray, and 4 foam sealing gaskets

	Code No.
15 x 10 cm	80-6060-62
15 x 15 cm	80-6060-81
15 x 20 cm	80-6061-00

HE 99x gel casting trays

15 x 10 cm	1	80-6059-86
15 x 15 cm	1	80-6060-05
15 x 20 cm	1	80-6060-24

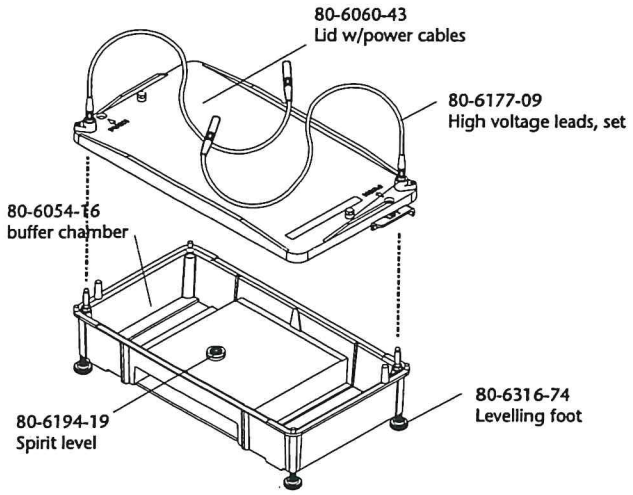
HE 99x gel running trays

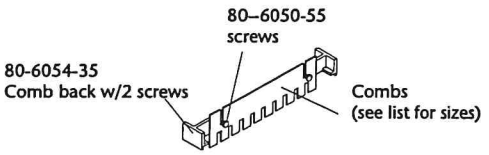
15 x 10 cm	1	80-6058-15
15 x 15 cm	1	80-6058-34
15 x 20 cm	1	80-6058-53

Combs

no. of wells	comb thickness (mm)	well width (mm)	Code No.
1/2*	1.0	113/10	80-6057-39
1/2*	1.5	113/10	80-6057-58
1/2*	3.0	113/10	80-6057-77
10	1.5	9.7	80-6055-68
10	3.0	9.7	80-6055-87
15	1.0	7.1	80-6056-06
15	1.5	7.1	80-6056-25
15	3.0	7.1	80-6056-44
20	1.0	4.7	80-6056-63
20	1.5	4.7	80-6056-82
20	3.0	4.7	80-6057-01
30	1.0	3.0	80-6057-20

*Preparative combs form two marker wells, one on each side of the preparative well. The first value in each column refers to the prep well, the second to the reference well.





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