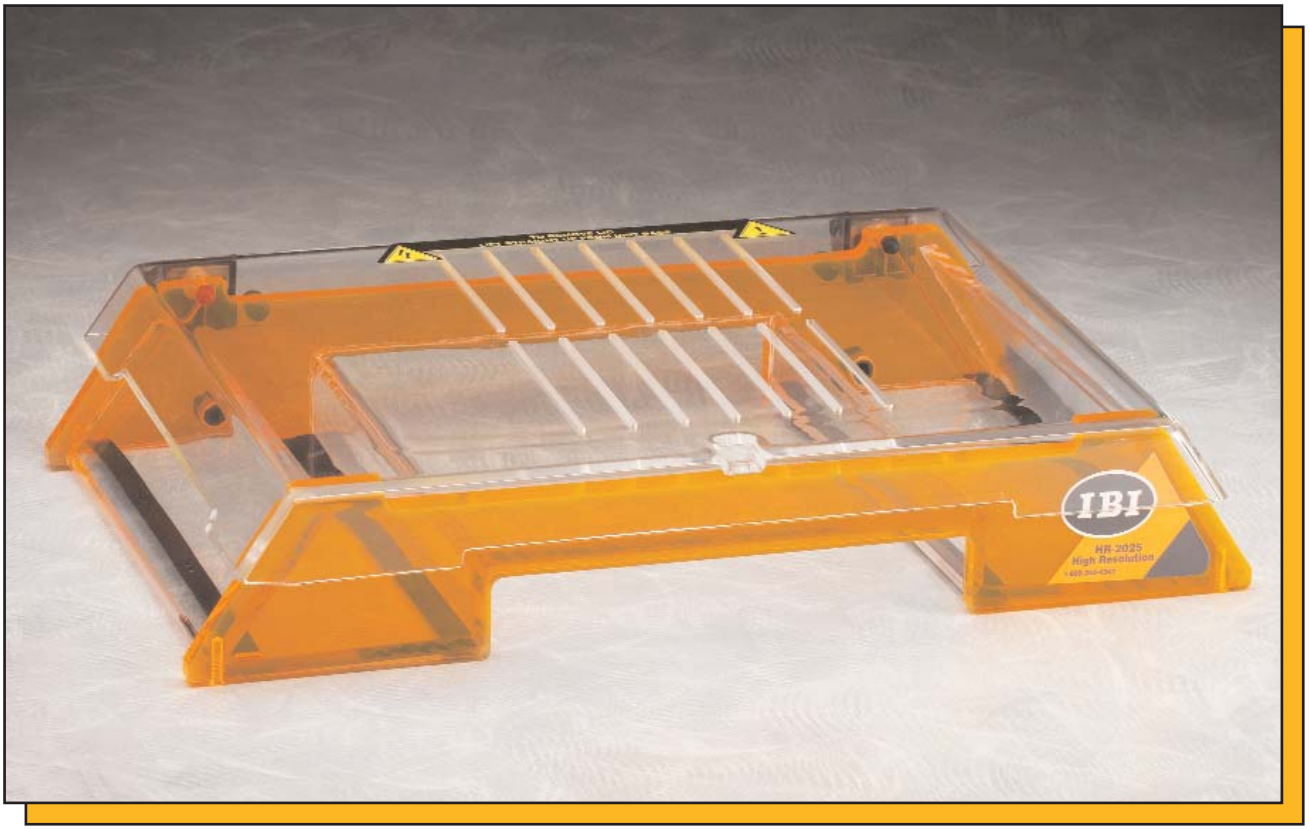
Operator's Manual

HR-2025 - High Resolution

Horizontal Gel Electrophoresis Unit

Gel Size: 20cm x 25cm



IBI Catalog Number: **IB56000**

IBI SCIENTIFIC

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A. Safety Information

Important Safety Information!

- Please read this manual carefully before operating your new IBI HR-2025 unit.
- This manual contains important operating and safety information.
- To best use the product, please read the entire manual carefully prior to use.
- To avoid possible injury, this product should only be used for its intended purpose.

B. Package Contents

Upon receiving this product, please verify all of the noted parts and accessories are contained in this package.

- Model HR-2025 Buffer Tank
- Patented HR-2025 Vented Lid
- UV Transmittant Casting Tray
- Casting Fixture
- One Set of 2.0mm x 20 Tooth Combs (2 ea.)
- One Set of Power Cords (Red and Black)
- Four adjustable feet
- Two sets of fittings for recirculation feature (two straights and two elbows)
- Bubble Level
- Operation Manual

NOTE: Carefully inspect all items in the package to insure no items are broken or missing. If there are items broken, please inspect the package carefully for signs of shipping damage. If there is ANY sign of shipping damage, please contact the carrier and file a claim with them immediately.

C. Product Specifications

	Height	Width	Length
Unit Dimensions	8.3cm	23.5cm	39.4cm
Gel Dimensions		20.0cm	25.0cm

Maximum Sample Capacity: 160 Samples - 4 Combs, 40 samples each
Buffer Capacity: 1200ml
Distance Between Electrodes: 35.0cm

D. Operating Instructions

Your new HR-2025 High Resolution Horizontal Electrophoresis Unit is cleaned and wiped prior to packaging; however, components should be washed in warm soapy water prior to use in the laboratory. A mild dish washing liquid, like Joy, works well.

Gently wash the tank, lid, UVT casting tray, and casting fixture in warm soapy water, taking care not to scratch any of the acrylic components such as the tank and UVT tray. Do NOT wash Power Cords.

NOTE: It is also recommended that the UVT casting tray be cleaned with alcohol prior to use. Be certain the entire unit is dry prior to use.

Preparation Of the Agarose Gel - DNA

1.) Select the percentage gel necessary to effectively resolve your sample, use Table 1 as a guide.

Table 1 Gel Concentrations and Resolving Ranges

Concentration of Agarose in Gel (% w/V)	Efficient Range of Separation of Linear DNA (Kb)
0.3%	5 - 60
0.6%	1 - 20
0.7%	0.8 - 10
0.9%	0.5 - 7
1.2%	0.4 - 6
1.5%	0.2 - 3
2.0%	0.1 - 2

* Table taken from Sambrook, J., Fritsch, E.F., & Maniatis, T. (1989) Molecular Cloning, A Laboratory Manual, 1, 6. 8, 613.

2.) Weigh an appropriate quantity of agarose (0.3% means 0.3gm of agarose per 100ml of gel volume) and place it into a 500ml flask.

3.) Make up 500ml of either 1X TAE or 1X TBE electrophoresis buffer. See below:

Electrophoresis Buffers

The two most commonly used buffers for horizontal electrophoresis of double stranded DNA in agarose gels are Tris-Acetate-EDTA (TAE) [IB70160] and Tris-Borate-EDTA (TBE) [IB70150]. While the resolving powers of these buffers are very similar, the relative buffer capacities are very different, conferring different run attributes which are summarized below:

TAE (IB70160): Tris-acetate has traditionally been the more commonly used buffer. However, its relatively low buffer capacity will become exhausted during extended electrophoresis, making buffer recirculation necessary in runs exceeding 140 mA-hours. Potential advantages of using TAE buffer over TBE buffer include superior resolution of supercoiled DNA and approximately 10 % faster migration of double-stranded linear DNA fragments.

TBE (IB70150): Tris-borate's significantly greater buffering capacity and its relatively low current draw eliminates the need for recirculation in all but the most extended runs (> 300 mA-hours). TBE buffer systems are not recommended when fragments are to be recovered from the gel after electrophoresis.

4.) Add ethidium bromide (IB40075) to the diluted electrophoresis buffer to a final concentration of 0.5µg/ml.

NOTE: The addition of ethidium bromide to both the gel and the running buffer will result in maximum detection levels by providing high levels of sample fluorescence with an evenly low level of background.

5.) Add 14ml of the 1X electrophoresis buffer containing ethidium bromide made in step 4 per millimeter of gel thickness desired, up to a maximum of 140ml, to the flask containing the agarose (IB70035-40-42-45). A 125ml gel solution will make a 9mm thick gel. Thinner gels may be made, however care must be taken that the wells are deep enough to accommodate the desired sample volume.

Catalog #	Comb Description	Well Width	Sample Volume Per mm Gel
IB54180	1.0mm, 10 tooth	16.6mm	16.6ul
IB56055	1.0mm, 15 tooth	9.8mm	9.8ul
IB54060	1.0mm, 20 tooth	6.5mm	6.5ul
IB54090	1.0mm, 30 tooth	4.0mm	4.0ul
IB56100	1.0mm, 40 tooth	3.2mm	3.2ul
IB56101	1.0mm, 44 tooth MCP**	2.9mm	2.9ul
IB56125	2.0mm, 15 tooth,	9.8mm	19.6ul
IB54070	2.0mm, 20 tooth	6.5mm	13.0ul
8091100	2.0mm, 22 tooth MCP**	6.3mm	12.6ul
IB56102	2.0mm, 44 tooth MCP**	2.9mm	5.8ul
IB56135	2.0mm, 40 tooth,	3.2mm	6.4ul
IB54100	2.0mm, 30 tooth	4.0mm	8.0ul
IB54190	3.0mm, 10 tooth	16.6mm	49.8ul
IB54080	3.0mm, 20 tooth	6.5mm	29.4ul
8093767	3.0mm, 22 tooth MCP**	6.3mm	18.9ul
IB54110	3.0mm, 30 tooth	4.0mm	12.0ul
IB56140	3.0mm, 40 tooth	3.2mm	9.6ul
IB56103	3.0mm, 44 tooth MCP**	2.9mm	8.7ul
IB54120	1.0mm, 2 Markers, 1 Sample	4.0mm, 184.0mm	4.0ul, 184ul
IB54140	1.0mm, 2 Markers, 2 Samples	4.0mm, 91.0mm	4.0ul, 91ul
IB54130	2.0mm, 2 Markers, 1 Sample	4.0mm, 368mm	8.0ul, 368ul
IB54150	2.0mm, 2 Markers, 2 Samples	4.0mm, 184.0mm	8.0ul, 182ul
IB56145	3.0mm, 2 Markers, 1 Sample	4.0mm, 368.0mm	12.0ul, 552ul
IB56150	3.0mm, 2 Markers, 2 Samples	4.0mm, 91.0mm	12.0ul, 273ul

** Multichannel Pipette Compatible

6.) Note the total solution volume so that a degree of evaporation can be determined and corrected for.

7.) Heat the agarose slurry in a microwave oven for 90 seconds. Swirl the flask to make sure any grains sticking to the walls enter into the solution, undissolved agarose appears as small "lenses" floating in the solution. Heat the solution for an additional 30-60 seconds. Re-examine the solution and repeat the heating process until the agarose completely dissolves.

8.) Add deionized water to replace any volume lost through evaporation during the heating process.

Proceed to "Casting the Gel" on page 6.

PREPARATION OF THE AGAROSE GEL - RNA

RNA molecules are separated by electrophoresis through denaturing gels prior to analysis by northern hybridization. Agarose gels containing formaldehyde are commonly used for RNA electrophoresis. Presented below is a general protocol for electrophoresis of RNA using formaldehyde gels.

CAUTION! All equipment and solutions used in the following protocol should be treated with DEPC (diethyl pyrocarbonate) or acetic anhydride prior to use to inhibit RNase activity. It is recommended that dedicated solutions be made solely for RNA work to minimize the risk of sample degradation due to RNase activity.

NOTE: Staining RNA samples with ethidium bromide has been reported to reduce sample blotting efficiency. Therefore, if samples are to be analyzed by northern hybridization after electrophoresis, run a duplicate lane(s) for staining, or minimize the exposure of RNA samples to ethidium bromide by following the post-electrophoresis staining protocol on page 10.

The following protocol will make 50ml of a 1.5% agarose gel containing 1X MOPS [3-(N-Morpholino)-Propanesulfonic Acid]-Acetate-EDTA (MAE) buffer and 2.2M formaldehyde, resulting in a 7.5mm thick gel:

1.) Weigh 1.5gm of agarose, and place into a 125ml flask.
2.) Add 87ml of DEPC (or acetic anhydride) treated water.
3.) Make note of the total solution volume so that degree of evaporation can be determined and corrected for.
4.) Heat the agarose slurry in a microwave oven for 60 seconds. Swirl the flask to make sure any grains sticking to the walls enter into the solution. Undissolved agarose appears as small "lenses" floating in the solution. Heat for an additional 30-60 seconds. Re-examine the solution and repeat the heating process until the agarose completely dissolves.
5.) Add deionized water to replace any volume lost through evaporation during the heating process.
6.) Allow the solution to cool to 60^{o}C. Place the flask in a hood and add 10ml of 10X MAE buffer, and 3ml of 37% formaldehyde.

CAUTION: Formaldehyde vapors are toxic. Gel preparation should take place in a hood and solutions and gels containing formaldehyde should be kept covered when possible.

Casting the Gel

1.) Place the gel casting fixture on a lab bench. Check to see that it is level by placing the supplied leveling bubble in the center of the platform. The bubble should appear within the center circle.

CAUTION! Cast agarose gels containing formaldehyde in a hood.

2.) Insert the gel casting tray into the casting fixture by pressing one end of the tray against the thick foam backed casting pad. While compressing the foam pad with the casting tray, move the other end of the tray down into the casting fixture (see Photo 1).
3.) When the gel solution has cooled to approximately 55^{o}C, slowly pour it into the gel tray. If hotter gel solutions are routinely poured, the tray may warp over time.
4.) If bubbles form on the surface of the gel upon pouring, use the comb to either pop them or lightly brush them to the sides of the gel. If large bubbles are allowed to harden within the gel, they may cause artifacts to occur during electrophoresis.

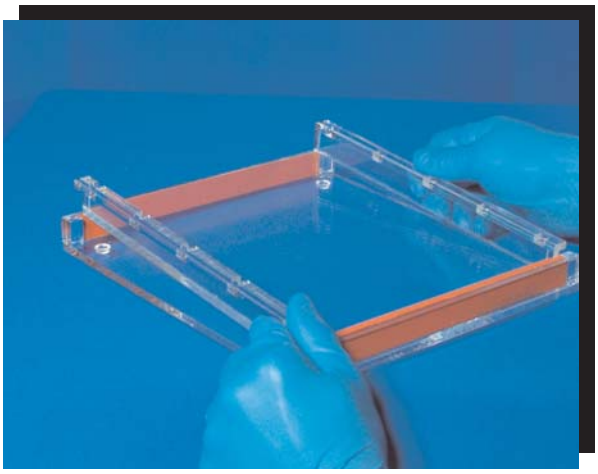

Photo 1

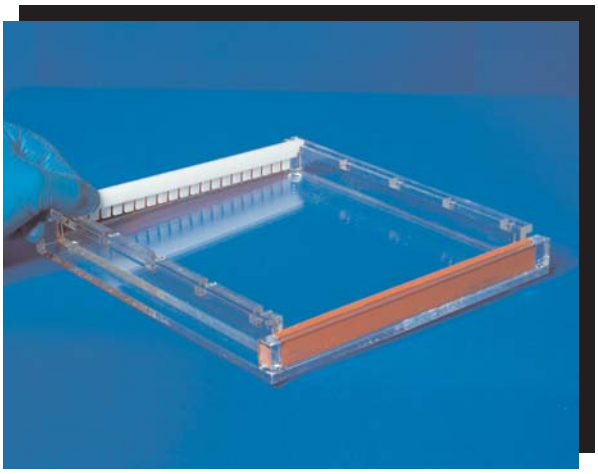

Photo 2

5.) Insert one or more combs by placing them into the slots in the casting tray. For best results, place the comb in the slot nearest the thin pad of the casting fixture. If two combs are desired, place the second in the center comb slot (see Photo 2 - opposite page).

6.) Allow the gel to harden undisturbed for at least 30 minutes.

Removing the Comb

1.) When the gel is solidified and fully opaque, carefully remove the comb with a gentle wiggling, upward motion. If the comb is difficult to remove or if a low percentage gel is being used, overlay the comb area with a small volume of 1X electrophoresis buffer to preserve the integrity of the wells. Check the wells to ensure their bases are intact.

CAUTION: Prolonged exposure of the Delrin combs to gels containing formaldehyde will cause them to degrade. Be sure to remove the comb(s) from formaldehyde gels as soon as gel hardening is complete and rinse them well prior to storage.

If a gel is not to be used immediately after preparation, remove it from the casting fixture and place it in a plastic bag or container submerged in 1X electrophoresis buffer containing 1mM NaN3. Store at +4^{o}C.

Loading the Samples into the Gel

1.) Remove the casting tray containing the hardened agarose gel from the casting fixture by pressing the casting tray against the foam pad and lifting at the thin pad end. Place the tray and gel into the main unit assembly such that the samples wells are on the same end as the negative (black) electrode. (see Photo 3)

2.) Fill the unit with the remaining 1X electrophoresis buffer containing ethidium bromide made previously (or 1X MAE buffer for RNA gels), covering the gel to a depth of 1-5mm. Approximately 500ml of buffer will be required.

Photo 3

NOTE: Use of the same batch of electrophoresis buffer for both the gel and the running buffer is very important. Slight variations in buffer composition between gel and running buffer may result in ionic or pH gradients that can significantly impact the mobility of the samples.

3.) Pre-run RNA gels at 100V for five minutes prior to loading the samples.

4.) Load the samples into the wells with a micropipette or similar device taking care not to puncture the bottom of the wells or load the sample onto the top of the gel. For improved well visualization during sample loading, be sure that the wells are positioned over the contrasting stripes located on the bottom of the buffer tanks.

Electrical Connections to the Safety Lid

CAUTION: This unit is intended to be used with a power supply which detects a no current condition and prevents a current flow unless there is a completed circuit path. Use of other power supplies may compromise the safety of this unit.

The HR-2025 can only be operated with the safety lid in place. Electrical current is supplied through the banana plugs to the lid which, in turn, connect to the gold plated tank connectors. A simple gravity connector in the cover ensures a complete current path, yet allows the lid to be removed from the unit without disturbing the loaded samples.

1.) Plug the female ends of the black (-) and red (+) leads into the banana jacks on the rear of the lid. Be certain that the black (-) plug is connected to the cathode end, where the samples originate (see Photo 4).

2.) After the samples have been loaded into the gel, place the lid over the unit so that the connector covers align with the round tank connectors.

3.) Set the lid straight down so that the lid rests squarely on the unit and the round tank connectors are inside the connector covers.

4.) Make sure the power supply is turned off. Plug the male ends of the red and black leads into a corresponding set of jacks on the power supply (black - black; red - red).

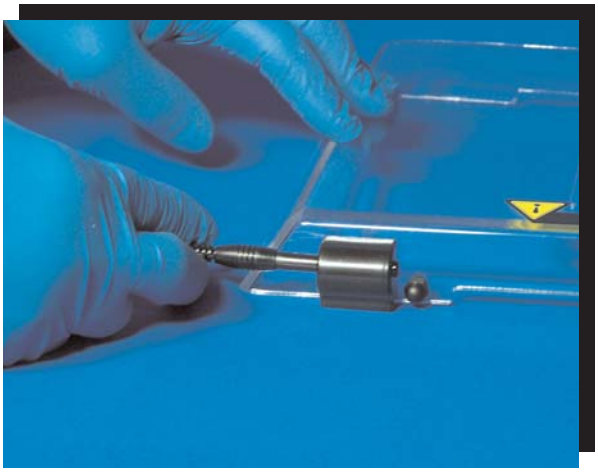

Photo 4

CAUTION: Do not jar or bump the gel box once the lid is place. The electrical connection is made by gravity once the lid is in position. While this design helps to minimize sample disturbance during lid placement, it also may result in a disruption of power to the unit if the lid or unit are disturbed during the run.

Sample Electrophoresis

1.) The HR-2025 is designed for quick screen electrophoresis. The maximum suggested applied voltage for the electrophoresis of DNA in agarose gels using the HR-2025 is 200V. In a 1% TBE gel, this translates into a run time of approximately 1/2 hour. Lower voltages may be used, of course, and as a general rule, a 70V run will take twice as long as a 140V run. Higher voltages may be used to decrease run time, however, if the unit is being operated at higher voltages than 140V, the heat generated during electrophoresis may decrease sample resolution. Such artifacts may be avoided by running the unit in a cold room or adding 1X electrophoresis buffer "ice cubes" to keep the unit properly cooled.

CAUTION: DO NOT EXCEED THE MAXIMUM OPERATING VOLTAGE OF 200 VOLTS.

The suggested run parameters for the electrophoresis of RNA in agarose gels containing formaldehyde is 80-100V.

CAUTION: Formaldehyde vapors are toxic. Electrophoresis of RNA in gels containing formaldehyde should take place within a fume hood.

2.) Follow the sample migration into the gel using the loading dye as an indicator. (See "Choice of Buffer" for the Sample Loading Buffer recipe) Allow the samples to migrate until the fragments have separated, normally until the bromophenol blue dye front has migrated 3/4 of the way down the gel.

NOTE: If the gel contains ethidium bromide, the progress of electrophoresis may be monitored during the run by turning off the power supply, removing the lid, and shining a medium-wave UV light onto the gel. The resolved bands will appear as orange bands against a dark purple background.

Detection and Documentation of Separated Fragments

1.) At the completion of the run, turn off the power supply and disconnect the leads. Remove the lid (it is not necessary to remove the power leads from the lid) and remove the gel tray.

2.) To stain RNA gels containing formaldehyde post electrophoresis, soak the gel in 1L of DEPC-treated water overnight at room temperature. Transfer the gel to a solution of 20X SSC containing 0.5µg/ml of ethidium bromide, stain for 5 -10 minutes.

3.) Ethidium bromide stained samples are visualized by exposing them to medium wavelength (312nm) UV light. Because the gel casting tray is UV transmittant, the gel does not need to be removed from the tray before viewing. Place the gel casting tray containing the gel on the filter surface of a UV transilluminator for convenient viewing.

4.) Sample banding patterns may be documented by autoradiography.

Choice of Buffer

NOTE: Tris-borate buffer allows faster sample migration than tris-acetate buffers with no apparent loss of resolution. A tris-borate buffer is usually the choice for quick-screening. Phosphate buffers are used with glyoxal or formaldehyde gels.

The two most commonly used buffers for horizontal electrophoresis of double stranded DNA in agarose gels are Tris-Acetate-EDTA (TAE) and Tris-Borate-EDTA (TBE). While the resolving powers of these buffers are similar, the relative buffer capacities are very different, conferring different run attributes which are summarized below:

- **Tris-Acetate** has traditionally been the more commonly used buffer. However, its relativity low buffer capacity will become exhausted during extended electrophoresis, making buffer recirculation necessary in runs exceeding 140mA-hours. Potential advantages of using TAE buffer over TBE buffer include superior resolution of supercoiled DNA and approximately 10% faster migration of the double-stranded linear DNA fragments.
- **Tris-Borate** has a significantly greater buffering capacity and its relativity low current draw eliminates the need for recirculation in all but the most extended runs (>300mA-hours). TBE buffer systems are not recommended when fragments are to be recovered from the gel after electrophoresis.

TRIS ACETATE EDTA BUFFER (TAE) - IB70160:

1X Working Concentration:	10X Stock Solution:
40 mM Tris base	48.4 g Tris Base
20 mM Glacial Acetic Acid (NaOAc)	16.4 g or 11.42ml NaOAc
2.0 mM EDTA	7.4 g EDTA or 20ml 0.5M EDTA (pH 8.0)
pH 8.3	H_2O to 1L

TRIS BORATE EDTA BUFFER (TBE) - IB70150:

1X Working Concentration:	10X Stock Solution:
89 mM Tris Base	108g Tris Base
89 mM Boric Acid	55g Boric Acid
2.0 mM EDTA	6.72g EDTA or 40ml 0.5M EDTA (pH 8.0)
pH 8.0	H_2O to 1 liter

MOPS ACETATE EDTA (MAE) - IB70175:

Solutions containing MOPS should be wrapped in aluminum foil and stored at room temperature. The buffer tends to yellow with age. Light yellow buffer may be used, however, dark yellow solutions should be discarded.

1X Working Concentration:	10X Stock Solution:
20 mM MOPS (pH 7.0)	41.8g MOPS
8 mM NaOAc	800 ml DEPC treated H_2O
1 mM EDTA (pH 8.0)	adjust pH to 7.0 with NAOH and add:
	16.6ml 3M DEPC-treated NaOAc
	20.0ml 0.5 M DEPC-treated EDTA, pH 8.0
	bring to 1.0 liter and filter

Solutions containing MOPS should be wrapped in aluminum foil and stored at room temperature. The buffer tends to yellow with age. Light yellow buffer may be used, however, dark yellow solutions should be discarded.

Sample Loading Buffer - DNA

10X Stock Solution:

50 % Glycerol
100mM Na_3EDTA
1% SDS
0.1% Bromophenol Blue
pH 8.0

Sample Loading Buffer - RNA

5X Stock Solution:

1 mM EDTA, pH 8.0
0.25 % Bromophenol Blue
0.25 % Xylene Cyanol
50 % Glycerol

VOLTAGE

The HR-2025 is designed for multipurpose electrophoresis. The maximum suggested voltage for the electrophoresis of DNA in agarose gels is 140V for a 30 to 60 minute run. Higher voltages may be used to decrease run time, however, the volt-hours should remain constant. If the unit is being operated at higher voltages than 140V, the heat generated during electrophoresis may decrease sample resolution. One should not exceed 200 volt-hours without changing the buffer in the unit. If the unit begins to operate at voltages higher than 150V we recommend adding 1X electrophoresis buffer "ice cubes" or utilizing the recirculation feature of the buffer tank to keep the unit properly cooled.

The suggested run parameters for the electrophoresis of RNA in agarose gels containing formaldehyde are 60-80 volts.

STAINING SOLUTION

The simplest staining procedure is to add 1-5g Ethidium Bromide per ml of gel solution just prior to casting the gel. Alternatively, the gel can be stained in a solution of 5uG ethidium bromide/ml of 1X gel buffer for 15 minutes. Destain in deionized water or 1mM $MgSO_4$ for two minutes.

E. Maintenance Of Unit

Care must be observed in the handling of this unit.

DO NOT expose the unit to temperatures above 60°C

DO NOT expose the unit to organic solvents
DO NOT clean the unit with abrasive cleaners or cleaning aids.

Use mild cleaning solution (dish soap recommended) for routine cleaning. For heavier dirt, hand wash with soft cloth. In most cases, a rinse in deionized water is sufficient to clean the unit. To remove residual Ethidium Bromide from the gel unit, soak occasionally in 1% commercial bleach solution for 16 hours, and rinse well.

NOTE: The degradation of acrylic by solvents may result in substantial discoloration, cracking, warpage or etching of the electrophoresis unit. DO NOT apply any of the following solvents to the unit: benzene, xylene, toluene, chloroform, carbon tetrachloride, alcohol, phenol, ketones, or esters. Do not use the Delrin combs supplied with this unit in formaldehyde for long periods of time. The formaldehyde damages these combs with long exposures.

If an electrode breaks, contact Technical Support and Information Services at (800) 253-4942 for an electrode replacement.

Elimination of RNase Contamination

Should treatment of the unit to eliminate RNase contamination be desired, clean the unit with a mild detergent as described above, followed by soaking for 10 minutes in a solution of 3% hydrogen peroxide and then 1 hour in 0.1% DEPC (diethyl pyrocarbonate). Pour out final rinse and air dry.

CAUTION: DEPC is a suspected carcinogen, handle with care.

Alternatively, soak the unit and accessories in freshly made 2.2mM acetic anhydride treated water (200ul/liter) for at least five minutes. Solutions for RNA work (electrophoresis buffers, etc.) may be made from the same acetic anhydride treated water as well.

F. Replacement Parts & Accessories

HR-2015 Accessory Items and Replacement Parts:

Catalog #	Description
IB50500	Replacement Power Cords
IB50501	Replacement Elbows
IB50503	Replacement Feet
IB50504	Replacement Bubble Level
IB50505	Replacement Tank Connector Kit
IB52200	Replacement Tank Kit: Bubble Level, Feet, Buffer Port Set
IB52210	Replacement Buffer Port Set
IB54220	HRH/HR-2025 Quickloader
IB56020	HR-2025 UV Transmittant Casting Tray
IB56030	HR-2025 Casting Fixture
IB56040	HR-2025 UVT Casting Tray with Casting Fixture
IB56200	Replacement HR-2025 Buffer Tank
IB56300	Replacement HR-2025 Lid
IB56305	Replacement HR-2025 Electrode Assembly

HR-2025 Combs

Catalog #	Description	Well Width	Sample Volume per mmGel
IB54180	Analytical Comb, 1.0mm, 10 tooth	16.6mm	16.6ul
IB56055	Analytical Comb, 1.0mm, 15 tooth	9.8mm	9.8ul
IB54060	Analytical Comb, 1.0mm, 20 tooth	6.5mm	6.5ul
IB54090	Analytical Comb, 1.0mm, 30 tooth	4.0mm	4.0ul
IB56100	Analytical Comb, 1.0mm, 40 tooth	3.2mm	3.2ul
IB56101	Analytical Comb, 1.0mm, 44 tooth MCP**	2.9mm	2.9ul
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IB56150	Preparative Comb, 3.0mm, 2 Markers, 2 Samples	4.0mm, 91.0mm	12.0ul, 273ul

** Multichannel Pipette Compatible

Related IBI Products

IB50000 IBI QSH Lab-Pal (5 X 7cm Horizontal Electrophoresis Unit)
Comes complete with buffer tank, vented lid, 2-place casting tray, two 1.5mm by 5-tooth combs, four glass slide, power cords, and manual.

IB51000 IBI QS-710 (7 X 10cm Horizontal Electrophoresis Unit)
Comes complete with buffer tank, vented lid, casting fixture and UVT tray, two 1.5mm by 8-tooth combs, power cords, leveling bubble and manual.

IB53000 IBI MP-1015 (10 X 15cm Horizontal Electrophoresis Unit)
Comes complete with buffer tank, vented lid, casting fixture and UVT tray, two 2.0mm by 16-tooth combs, power cords, buffer port set, leveling bubble and manual.

IB57000 IBI HR-2525 (25 X 25cm Horizontal Electrophoresis Unit)
Comes complete with buffer tank, vented lid, casting fixture and UVT tray, four 2.0mm by 50-tooth combs, power cords, buffer port set, leveling bubble and manual.

IB62000 IBI VCV Vertical Electrophoresis System (18 X 22cm Vertical Electrophoresis Unit)
Comes complete with main assembly, safety cover, three glass plates (inner, outer, and frosted), one 1.5mm by 12-tooth and 1.5mm by 20-tooth combs, a 1.5mm spacer set (which includes one bottom and two sided spacers as well as two spacer tabs), one set of power cords, four sandwich clips, and manual.

IB80000 IBI STS-45i Manual Sequencer (36 X 43cm Vertical Electrophoresis Unit)
Comes complete with main assembly, aluminum thermoplate, two glass plates, one 0.4mm comb and spacer set (includes two 32-tooth and 64-tooth conventional combs, two 64-tooth sharkstooth combs, one bottom and two sided spacers and four spacer tabs) one set of power cords, and manual.

IB94000	IBI MaGELin Universal Protein System (for Cast-Your-Own or Precast Gels) Comes complete with buffer tank, gel capture device, vented lid, vertical casting fixture, two sets of 0.8mm side spacers, three outer glass plates, three inner notched plates, two 0.8mm by 12-tooth combs, power cords, and manual
SH-300	IBI 300V Power Supply (300V / 400mA / 120W) The SH-300 has constant voltage or constant current capability, memory settings, and a LED display. Comes complete with power supply, 120V grounded power cord, and manual.
SH-500	IBI 500V Power Supply (500V / 300mA / 150W) The SH-500 has constant voltage or constant current capability, memory settings, gel saver feature, and a LED display. Comes complete with power supply, 120V grounded power cord, and manual.

H. Related IBI Certified Reagents

IB01010	6X Loading Dye	5ml
IB01015	5X RNA Gel Loading Dye Kit	100RxN
IB01020	10X TBE Pouch	1 Pouch
IB01030	25X Tris-Acetate EDTA Buffer Pouch	1 Pouch
IB74020	Acridine Orange	25gm
IB70016	Acrylamide:Bisacrylamide, 29:1	40gm
IB70017	Acrylamide:Bisacrylamide, 29:1	200gm
IB70020	Acrylamide	100gm
IB70022	Acrylamide:Bisacrylamide, 19:1	40gm
IB70023	Acrylamide:Bisacrylamide, 19:1	200gm
IB70024	Acrylamide	500gm
IB70026	Acrylamide	1.5kg
IB70028	Acrylamide	3kg
IB70018	Acrylamide:Bisacrylamide, 37.5:1	40gm
IB70019	Acrylamide:Bisacrylamide, 37.5:1	200gm
IB70010	Acryliqud-40 (40% (w/v) Acrylamide solution)	500ml
IB70035	Agarose	25gm
IB70040	Agarose	100gm
IB70041	Agarose	250gm
IB70042	Agarose	500gm
IB70045	Agarose	1kg
IB70050	Agarose, Low Melting Point	50gm
IB70051	Agarose, Low Melting Point	25gm
IB70056	Agarose, Low Melting Point	100gm
IB70057	Agarose, Low Melting Point	250gm
IB70058	Agarose, Low Melting Point	500gm
IB70059	Agarose, Low Melting Point	1Kg
IB70052	3:1 Super Sieve Agarose	50gm
IB70053	3:1 Super Sieve Agarose	250gm
IB70054	Ultra Sieve Agarose	25gm
IB70055	Ultra Sieve Agarose	250gm
IB70060	Agarose, PFGE	25gm
IB70061	Agarose, PFGE	50gm
IB70062	Agarose, PFGE	100gm
IB70063	Agarose, PFGE	250gm
IB70064	Agarose, PFGE	500gm
IB70065	Agarose, PFGE	1Kg
IB15720	Alcohol-Anhydrous (Ethanol)	500ml
IB15721	Alcohol-Anhydrous (Ethanol)	1L
IB15724	Alcohol-Anhydrous (Ethanol)	4L
IB15620	Ammonium Acetate	500gm
IB70080	Ammonium Persulfate	100gm
IB02040	Ampicillin, Sodium Salt	25gm
IB70100	Bisacrylamide	25gm
IB70102	Bisacrylamide	100gm
IB70096	Boric Acid	2.5kg

IB74040	Bromophenol Blue	25gm
IB02010	Carbenicillin	1gm
IB02020	Carbenicillin	5gm
IB37060	Cesium Chloride, Optical Grade	100gm
IB37062	Cesium Chloride, Optical Grade	1kg
IB37042	Cesium Chloride, Technical Grade	1kg
IB02080	Chloramphenicol	25gm
IB05040	Chloroform	500ml
IB21040	Dithiothreitol (DTT)	5gm
IB21045	Dithiothreitol (DTT)	25gm
IB70180	EDTA, disodium salt	100gm
IB70182	EDTA, disodium salt	500gm
IB70184	EDTA Solution (0.5M), pH 8	100ml
IB70185	EDTA Solution (0.5M), pH 8	4x100ml
IB40060	Ethidium Bromide	5gm
IB40075	Ethidium Bromide Solution, 10mg/mL	10ml
IB72028	Formamide, ACS Grade	500ml
IB72020	Formamide, Spectral Grade	100ml
IB72024	Formamide, Spectral Grade	500ml
IB02030	Gentamycin Solution	20ml
IB15760	Glycerol	500ml
IB15762	Glycerol	1L
IB70194	Glycine	2.5kg
IB05080	Guanidine Hydrochloride	500gm
IB05085	Guanidine Hydrochloride Solution (6M)	500ml
IB05100	Guanidine Thiocyanate	500gm
IB01120	HEPES, Sodium Salt	100gm
IB01130	HEPES, Free Acid	50gm
IB01131	HEPES, Free Acid	250gm
IB01132	HEPES, Free Acid	500gm
IB01133	HEPES, Free Acid	1Kg
IB70012	InstaBIS-(2% (w/v) Bisacrylamide solution)	500ml
IB70000	InstaPAGE-(30% sol., 19:1 Acrylamide:Bisacrylamide)	500ml
IB70001	InstaPAGE-(30% sol., 19:1 Acrylamide:Bisacrylamide)	1L
IB70002	InstaPAGE-(30% sol., 29:1 Acrylamide:Bisacrylamide)	500ml
IB70003	InstaPAGE-(30% sol., 29:1 Acrylamide:Bisacrylamide)	1L
IB70004	InstaPAGE-(30% sol., 37.5:1 Acrylamide:Bisacrylamide)	500ml
IB70005	InstaPAGE-(30% sol., 37.5:1 Acrylamide:Bisacrylamide)	1L
IB70006	InstaPAGE-(40% sol., 29:1 Acrylamide:Bisacrylamide)	500ml
IB70007	InstaPAGE-(40% sol., 29:1 Acrylamide:Bisacrylamide)	1L
IB70008	InstaPAGE-(40% sol., 37.5:1 Acrylamide:Bisacrylamide)	500ml
IB70009	InstaPAGE-(40% sol., 37.5:1 Acrylamide:Bisacrylamide)	1L
IB70014	InstaPAGE-(40% sol., 19:1 Acrylamide:Bisacrylamide)	500ml
IB70015	InstaPAGE-(40% sol., 19:1 Acrylamide:Bisacrylamide)	1L
IB02100	IPTG	1gm
IB02105	IPTG	5gm
IB02125	IPTG	25gm
IB05120	Isobutanol	500ml
IB15730	Isopropanol	500ml
IB15735	Isopropanol	1L
IB02120	Kanamycin Sulfate	25gm
IB15750	Methanol - HPLC Grade	1L
IB15755	Methanol - Ultra Pure Grade	500ml
IB15756	Methanol - Ultra Pure Grade	1L
IB15757	Methanol - Ultra Pure Grade	4L
IB74050	Methylene Blue, Chloride, trihydrate	25gm
IB70170	MOPS	100gm
IB70175	MOPS Decp, 10X	100ml
IB05160	Phenol - Crystalline	100gm
IB05164	Phenol - Crystalline	500gm
IB05174	Phenol Chloroform Solution	400ml
IB05182	Phenol, Buffer Saturated, pH 6.6-8.0	100ml

IB05184	Phenol, Buffer Saturated, pH 4.3	100ml
IB05400	Proteinase K	100mg
IB05406	Proteinase K Solution (20mg/mL)	5ml
IB07080	Sarkosyl	100gm
IB07060	Sodium Dodecyl Sulfate (SDS)	100gm
IB07062	Sodium Dodecyl Sulfate (SDS)	500gm
IB07064	Sodium Dodecyl Sulfate (SDS) Solution, 20%	100ml
IB72010	SSC (20X)-Nucleid Acid Prep and Blotting Solution	1L
IB72015	SSPE (20X) - Nucleid Hybridization Solution	1L
IB02180	Streptomycin Sulfate	25gm
IB37160	Sucrose	1kg
IB70120	TEMED	50gm
IB02200	Tetracycline Hydrochloride	25gm
IB70142	Tris	500gm
IB70144	Tris	1kg
IB70145	Tris	5kg
IB70150	Tris Borate EDTA (10X TBE Buffer)	1L
IB70153	Tris Borate EDTA (10X TBE Buffer)	4L
IB70154	Tris Borate EDTA (10X TBE Buffer)	10L
IB70155	Tris Borate EDTA (20X Modified TBE Buffer)	1L
IB70160	Tris Acetate EDTA (10X TAE) Buffer	1L
IB70162	Tris-Hydrochloride	500gm
IB07100	Triton X-100	100ml
IB72060	Urea	500gm
IB72064	Urea	2.5kg
IB02260	X-GAL	1gm
IB02264	X-GAL	100mg
IB72120	Xylene Cyanol FF	25gm

I. References

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2.) Sambrook, J., Fritsch, E.F., and Maniatis, T., (1989). Molecular Cloning, A Laboratory Manual, volume 1. Cold Spring Harbor Press, New York.

3.) Selden, R.F. (1988) Analysis of RNA by Northern Hybridization," in Current Protocols in Molecular Biology, F.M. Ausubel, et. al, editors, volume 1, p.4.9.1. Green Publishing Associates and Wiley-Interscience.

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