

INSTRUCTION MANUAL

DUAL COOL ELECTROPHORESIS SYSTEM

Mini-Vertical Slab Gel/Blotting System

DCX-700



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IMPORTANT USER INFORMATION

This Instruction Manual will explain how to use this product safely and effectively. Please read and carefully follow the instruction manual in its entirety.



The triangle/exclamation mark symbol alerts the user of the product to important operational, maintenance, and/or warranty requirements.



The triangle/lightning bolt symbol alerts the user of the product to potentially hazardous electrical exposure.




Failure to adhere to the instructions could result in personal and/or laboratory hazards, as well as invalidate any warranty. Always turn off the DC power source prior to disconnecting power cords from the product. Disconnect power cords from the power source first and then from the product. For maximum safety, always operate this system in an isolated, low traffic area, not accessible to unauthorized personnel. Never operate damaged or leaking equipment.

WARRANTY AND LIABILITY

This product was produced utilizing the highest practical standards of materials, workmanship, and design. C.B.S. SCIENTIFIC warrants that the product has been tested and will meet or exceed published specifications. This warranty is valid only if the product has been operated and maintained according to the instructions provided.

C.B.S. SCIENTIFIC warrants this product to be free from defects in materials and workmanship under normal service for one year from date of shipment. If the product proves defective during this period, C.B.S. SCIENTIFIC will repair or replace it at our option, free of charge, if returned to us postage prepaid. This warranty does not cover: damage in transit, damage caused by carelessness, misuse or neglect, normal wear through frequent use, damage caused by solvent corrosion, damage caused by improper handling or user alteration, nor unsatisfactory performance as a result of conditions beyond our control. C.B.S. SCIENTIFIC shall in no event be liable for incidental nor consequential damages, including without limitation, lost profits, loss of income, loss of business opportunities, loss of use and other related damages, however caused, nor any damage arising from the incorrect use of the product.

<p>FRANÇAIS INFORMATION IMPORTANTE À L'USAGE DES UTILISATEURS</p> <p>Le présent manuel d'utilisation explique la manière de se servir efficacement du produit en condition de sécurité. Il est recommandé de soigneusement lire la totalité du manuel, avec ses consignes et ses instructions.</p> <p> Le triangle avec point d'exclamation est un symbole destiné à avertir l'utilisateur du produit de l'importance de certaines exigences relatives au fonctionnement, à l'entretien et/ou à la garantie.</p> <p> Le triangle avec flèche en zigzag est un symbole destiné à avertir l'utilisateur du produit de la possibilité d'exposition à des décharges avec danger de secousses électriques.</p> <p> Tout manquement à l'observation des consignes et des instructions peut exposer les personnes et les biens à des dommages corporels et/ou matériels et peut annuler toute garantie. Il faut toujours interrompre l'alimentation de courant continu avant de déconnecter les cordons d'alimentation du produit. Déconnecter d'abord les cordons d'alimentation branchés sur la source de tension (alimentation de secteur) puis ceux branchés sur le produit. Pour une sécurité maximum, il faut toujours faire fonctionner ce système dans un lieu isolé, peu fréquenté, où le personnel non autorisé n'a pas accès. Ne jamais faire fonctionner un matériel endommagé ou affecté par des fuites.</p> <p>GARANTIE ET RESPONSABILITÉ</p> <p>Le produit a été fabriqué conformément aux normes applicables les plus exigeantes en matière de matériaux, de main d'œuvre, de conception et d'ingénierie. C.B.S. SCIENTIFIC garantit que le produit a subi des essais et que ses performances rempliront les conditions des spécifications publiées ou leur seront même supérieures. La présente garantie n'est valide que si le produit a fonctionné et a été entretenu conformément aux consignes et instructions fournies.</p> <p>C.B.S. SCIENTIFIC garantit que le produit sera dépourvu de vices de matériaux et de main d'œuvre, en conditions de service normales, pendant un an à compter de la date d'expédition. Au cas où le produit s'avérerait défectueux pendant cette période de garantie, C.B.S. SCIENTIFIC réparera ou remplacera le produit, à sa discrétion et gratuitement, si le produit lui est retourné port payé d'avance. La garantie ne couvre pas les dommages de transport; les dommages causés par l'imprudence, le manque de soins, l'abus ou la négligence; l'usure normale résultant d'une utilisation fréquente; les dommages causés par la corrosion des solvants; et les dommages causés par la manipulation inadéquate ou des changements apportés par l'utilisateur. La garantie ne couvre pas non plus les performances non satisfaisantes résultant de conditions hors du contrôle de C.B.S. SCIENTIFIC. C.B.S. SCIENTIFIC ne pourra en aucun cas être tenue responsable de dommages indirects, y compris, de manière non limitative, la perte de bénéfices, le manque à gagner, la perte d'occasions d'affaires, l'impossibilité d'usage ou tous autres dommages associés, quelle qu'en soit la cause, ni de dommages résultant de l'usage incorrect du produit.</p>	<p>ESPAÑOL INFORMACIÓN IMPORTANTE PARA EL USUARIO</p> <p>El presente instructivo explica la manera de usar este producto en forma segura y efectiva. Sírvase leerlo en su totalidad y seguir detenidamente las indicaciones que contiene.</p> <p> El símbolo del triángulo con exclamación llama la atención del usuario a requisitos importantes para el uso y mantenimiento del producto, así como para la validez de la garantía.</p> <p> El símbolo del triángulo con rayo llama la atención del usuario a la posibilidad de riesgos eléctricos.</p> <p> El incumplimiento de las instrucciones aquí señaladas podría dar lugar a riesgos a la persona, al laboratorio o a ambos y podría anular toda garantía. Siempre apague la fuente de corriente continua antes de desconectar los cables eléctricos del producto. Primero desconecte los cables de la fuente de energía y después del producto. Para mayor seguridad, siempre use este sistema en un área aislada, de poco movimiento de personas e inaccesible a personal no autorizado. Jamás use equipo que presenta algún daño o fuga.</p> <p>GARANTÍA Y RESPONSABILIDAD</p> <p>Este producto fue fabricado de acuerdo con las normas más estrictas que sean factibles en cuanto a materiales, mano de obra y diseño. C.B.S. SCIENTIFIC garantiza que se sometió el producto a pruebas y que cumplirá o excederá las especificaciones publicadas. Esta garantía será válida únicamente si se usa y se da servicio de mantenimiento al producto de acuerdo con las instrucciones señaladas.</p> <p>C.B.S. SCIENTIFIC garantiza que este producto se encontrará libre de defectos de materiales y mano de obra por un período de servicio normal de un año a partir de la fecha de embarque. Si el producto resulta defectuoso durante este período, C.B.S. SCIENTIFIC lo reparará o lo repondrá, a criterio de C.B.S. SCIENTIFIC, libre de cargos, si se devuelve el producto a C.B.S. SCIENTIFIC porte pagado. Esta garantía no cubre daños sufridos en tránsito, daños provocados por descuido, mal uso o negligencia, desgaste normal como consecuencia del uso excesivo, daños atribuibles a corrosión provocada por solventes, daños causados por el uso indebido o alteraciones realizadas por el usuario ni rendimiento insatisfactorio atribuible a circunstancias fuera del control de C.B.S. SCIENTIFIC. C.B.S. SCIENTIFIC en ningún caso asumirá responsabilidad por daños incidentales o subsequentes, incluyendo, en forma no limitativa, la pérdida de utilidades, de ingresos, de oportunidades comerciales o del uso del producto y otros daños afines, fuere cual fuere su origen, ni por daños derivados del uso incorrecto del producto.</p>
<p>DEUTSCH WICHTIGE INFORMATION FÜR DEN BENUTZER</p> <p>Diese Bedienungsanleitung beschreibt wie man dieses Produkt sicher und wirksam benutzt. Bitte lesen und befolgen Sie alle Anweisungen in dieser Anleitung.</p> <p> Das Dreieck mit Ausrufezeichen weist den Benutzer des Produktes darauf hin, daß wichtige Bedienungs-, Wartungs- und/oder Garantievorschriften zu beachten sind.</p> <p> Das Dreieck mit Zickzackblitz warnt den Benutzer des Produktes vor möglichen Gefahren durch elektrische Spannungen.</p> <p> Nichtbeachtung dieser Anweisungen kann zu persönlichen und/oder labortechnischen Schäden führen und gleichzeitig alle Garantien als nichtig erklären. Die DC Stromzufuhr muß immer, vor dem Entfernen der Stromkabel vom Produkt, abgeschaltet werden. Die Stromzufuhrkabel müssen zuerst von der Steckdose und erst dann vom Produkt entfernt werden. Um höchste Sicherheit zu gewährleisten sollte dieses System in einem abgesonderten und besonders ruhigen Bereich eingesetzt werden und vor Unbefugten sicher sein.</p> <p>GARANTIE UND HAFTUNG</p> <p>Dieses Produkt wurde unter Anwendung von Produkten mit höchster Qualität und aus Materialien mit bester Verarbeitung und modernstem Design hergestellt. C.B.S. SCIENTIFIC garantiert, daß das Produkt getestet wurde und alle publizierten Spezifikationen übertrifft. Diese Garantie ist jedoch nur gültig, wenn das Produkt nach der beigefügten Bedienungsanleitung bedient und gewartet wurde.</p> <p>C.B.S. SCIENTIFIC garantiert, daß dieses Produkt bei normaler Bedienung aus fehlerfreiem Material besteht und fehlerfrei in der Ausführung ist. Diese Garantie gilt für ein Jahr ab Lieferdatum. Sollte das Produkt in diesem Zeitraum fehlerhaft werden, bietet C.B.S. Scientific eine kostenlose Reparatur bzw. kostenlosen Ersatz, einschließlich freiem Rückporto. Diese Garantie schließt folgendes aus: Transportschaden, Schaden durch Nachlässigkeit, Mißbrauch oder Vernachlässigung, normale Abnutzung durch regelmäßigen Gebrauch, Schaden durch Säureangriff, Schaden durch falsche Handhabung, Veränderung des Produktes durch den Benutzer, oder unzureichende Leistungen die sich nicht im Verantwortungsbereich von C.B.S. SCIENTIFIC befinden. C.B.S. SCIENTIFIC kommt unter keinen Umständen für folgende Schäden auf: Sachschadensverlust, Einkommensverlust, Verlust von Geschäftsmöglichkeiten, Verlust der Anwendung und andere damit verbundene Schäden die auf irgend eine Art und Weise entstanden sind, oder Schäden die aus falscher Anwendung des Produktes entstanden sind.</p>	<p>ITALIANO INFORMAZIONI IMPORTANTI PER L'UTENTE</p> <p>Questo manuale spiega come utilizzare questo prodotto in maniera sicura ed efficiente. Si preghi di leggere e seguire con cautela le istruzioni di ogni parte di questo manuale.</p> <p> Il triangolo contenete il simbolo di un punto esclamativo avverte l'utente di importanti requisiti relativi al funzionamento, manutenzione e/o garanzia del prodotto.</p> <p> Il triangolo contenete il simbolo di un lampo avverte l'utente del prodotto della possibilità di pericoli dovuti a corrente elettrica.</p> <p> La mancata osservanza delle istruzioni può essere causa di pericolo alla propria persona ed al laboratorio, oltre a poter annullare la garanzia. Prima di distaccare il cordone d'alimentazione dal prodotto, spegnere sempre la sorgente di corrente continua. Distaccare i cordoni d'alimentazione prima dal lato della sorgente di tensione e poi dal lato del prodotto. Per maggior sicurezza, mettere sempre in funzione il prodotto in un'area isolata con poco traffico che non sia accessibile al personale non autorizzato. Non mettere mai in funzione un'apparecchiatura che sia danneggiata o abbia perdite.</p> <p>GARANZIA E RESPONSABILITÀ</p> <p>Questo prodotto è stato fabbricato seguendo gli standard più elevati per i materiali, la manodopera e la progettazione. La C.B.S. SCIENTIFIC garantisce il prodotto è stato sottoposto a prova e raggiunge o supera i valori pubblicati per i dati tecnici. Questa garanzia è valida solo se il prodotto è messo in esercizio e soggetto a manutenzione secondo le istruzioni fornite.</p> <p>La C.B.S. SCIENTIFIC garantisce che questo prodotto è libero di difetti di materiali e manodopera, in normali condizioni d'esercizio, per la durata di un anno dalla data di spedizione. Se, in questo periodo, il prodotto si dimostrerà difettoso, la C.B.S. SCIENTIFIC, a suo giudizio, lo riparerà o sostituirà. 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SECTION 1

General Information

1.1 Introduction

C.B.S. Scientific offers the Dual Cool Electrophoresis System for performing SDS-Page, acrylamide-nucleic acid separations and electro-blotting. The dual unit provides the capability of running or blotting two gels simultaneously under identical temperature controlled buffer conditions. Units include 2 freezer blocks, 2 blotting cassettes, 2 foam pads, and a white plastic reservoir conversion plate to allow for single runs.

This system is designed primarily to be used with a variety of precast gels. (See Table 1). Hand-cast gels can also be run in this unit with the use of accessory combs, plates and spacers.

Table 1: Features of Vertical Mini-Gel Systems

Model #	Single or Dual	Plate Dimensions (w x h)	Compatible Precast Gels	Cooling
DCX-700	Dual	10cm x 10cm	ClearPAGE™ Expedeon™ Invitrogen™	1 or 2 freezer blocks with stirring
		10cm x 8cm	ClearPAGE™ Expedeon™	
		10cm x 9cm (requires adapter #DCX-AP-109)	Lonza™	

1.2 Specifications

Constructions:	Polycarbonate/Polysulphone
Buffer chamber, safety cover, core	Pure Platinum wire .010" diameter
Electrodes	Silicone rated 7500VDC,
Power cords	200mA, 65°C
Combs	Teflon
Glass plates	Soda-lime float glass & Borosilicate
Spacers	PVC
Clamps	Polypropylene, stainless steel
Safety Certification	EN61010-1-1993 (IEC1010-1)

Table 2: Specifications

Model #	DCX-700
Shipping Weight	6 lbs
Overall Size	25(l) x 25(w) x 30(h) cm
Recommended buffer volume Cathode reservoir Anode reservoir	200mls 400mls (minimum) / 810mls (maximum)
Distance between electrodes	9 cm
Voltage limit	300 V

1.3 Comb Specifications for Hand Cast Gels

COMB OPTIONS standard teflon® combs				
Cat. #	# of teeth	thickness of teeth	width of teeth	estimated well volume
MX-0701	1	0.75	66.6	474.52
MX-0710	10	0.75	5.23	37.26
MX-0714	14	0.75	3.3	31.35
MX-1001	1	1.0	66.6	632.7
MX-1010	10	1.0	5.23	49.68
MX-1014	14	1.0	3.3	31.35
MX-1501	1	1.5	66.6	949.05
MX-1510	10	1.5	5.23	74.52
MX-1514	14	1.5	3.3	47.02

1.3 Safety



Power to the Dual Cool Electrophoresis System is to be supplied by an external DC voltage power supply that must be ground isolated so that the DC voltage output floats with respect to ground. For any power supply used, the maximum specified operating parameters for the units are:

Maximum Limits

300 VDC

30 watts power

150mA current

60°C ambient temperature



Current to the unit, provided from the external power supply, must enter the unit through the lid assembly, providing a safety interlock to the user. Current to the unit is broken when the lid is removed. **Do not attempt to use the unit without the safety lid, and always turn the power supply off before removing the lid, or when working with the unit in any way. Follow safety precautions specified by the power supply manufacturer.**

SECTION 2

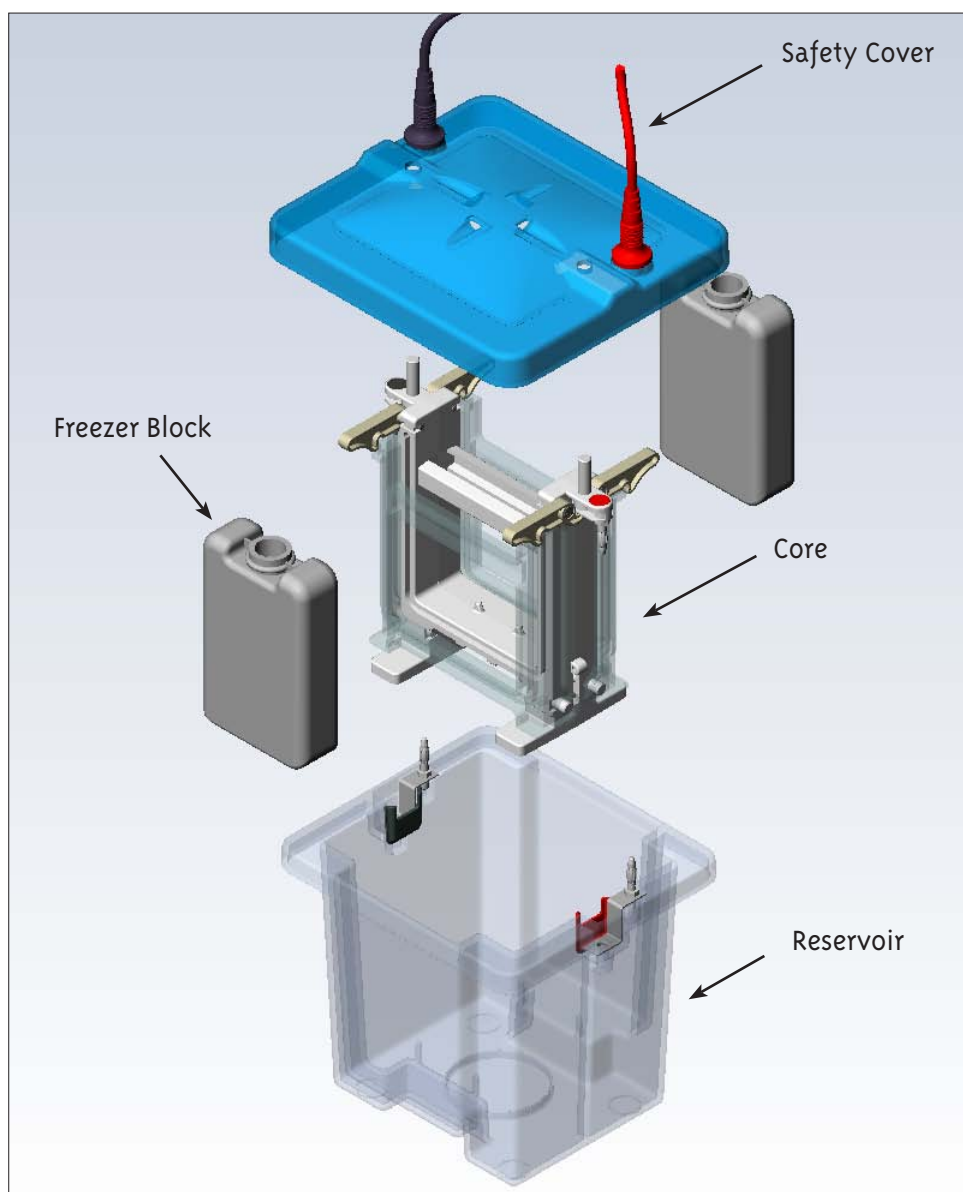
Description of Parts

2.1 Unpacking and Components

Please verify that your unit comes complete with the following components:

Dual Cool Electrophoresis System:

- Lower Reservoir
- Safety cover with attached DC power leads
- Core
- 2 freezer blocks
- 2 blotting cassettes with foam pads (not shown)
- Adaptor plate for running single gels (not shown)



SECTION 3

Instructions for Slab Gel Electrophoresis Using Pre-Cast Gels

3.1 Preparing the Electrophoresis Unit



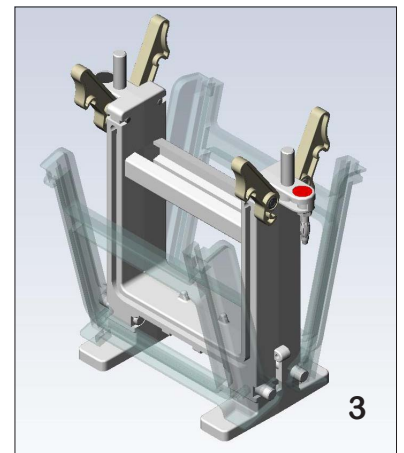
Place unit in authorized work area. Remove safety cover from the assembled unit by simultaneously pressing down on white push pins while lifting up on blue safety cover as shown in figure 1. **Do not remove safety cover by pulling up on leads!**



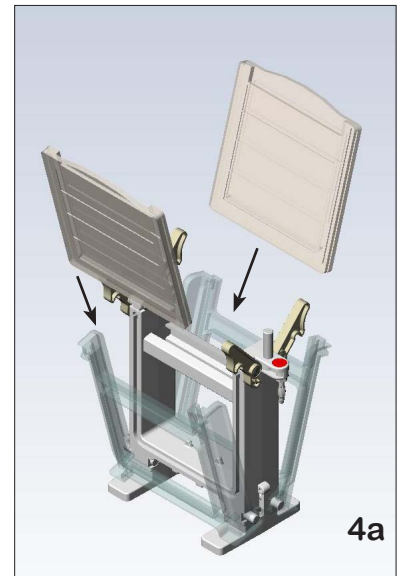
2. Remove white core from lower reservoir by grasping core with one hand and lifting directly up as shown in figure 2.



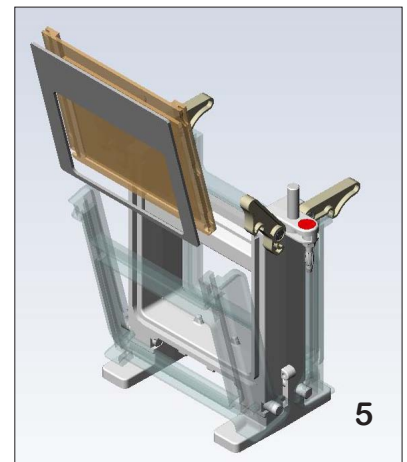
3. Open doors on the core assembly by pulling up on the white latches, as shown in figure 3.



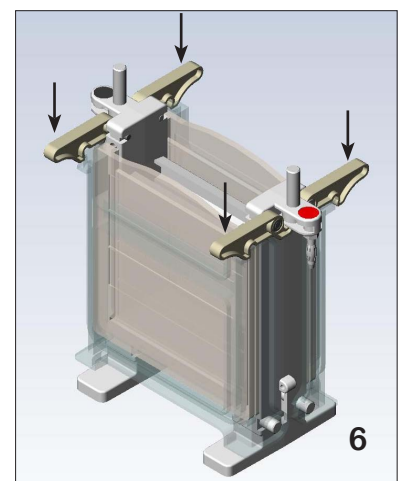
- Slide pre-cast gel cassette or plate set(s) into the core assembly with the notched plate facing in towards the upper buffer reservoir as shown in figure 4a and 4b. If using a pre-cast gel stored at 4°C, allow to warm to room temperature. If pouring your own gels please see Alternate Protocol (Section 4) on pages 11-13 describing gel casting using Gel Wrap™.



- If running one gel, slide white plastic adaptor plate into the side without the gel. If running a Cambrex 10cm x 9cm gel cassette place clear shim as shown in figure 5.



- Close doors and relatch by pressing down on the white latches so that the assembly looks like that shown in figure 6.
- Place stirring bar into bottom of reservoir in stirring corral (as shown in figure 7 on page 10).
- If using freezer blocks, take frozen blocks out of freezer and insert into receptacles on either side of lower reservoir.



3.2 Running the Gel



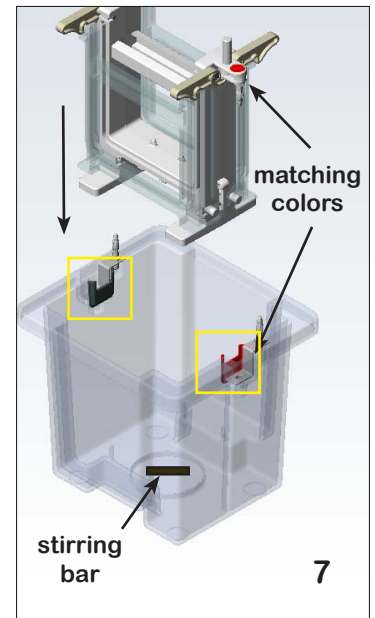
1. Place core assembly into lower reservoir. The anode (red) and cathode (black) electrodes are color-coded on both the core/cassette assembly and lower reservoir. See figure 7. Ensure the red dot on the cassette assembly is on the same side as the red receptacle on the lower reservoir. Fill core upper reservoir with freshly prepared buffer (~ 190mls).

If any buffer is spilled into banana jack receptacles (outlined in yellow boxes in figure 7) in lower reservoir, dry completely using compressed air! Failure to do this will result in accelerated banana jack corrosion.



2. **Important note if you are using the optional freezer cooling blocks:** Use table below to determine approximate buffer volume of lower reservoir. Each freezer block displaces 125mls of buffer. Add buffer to lower chamber only *after* freezer blocks are in place.

Approximate buffer required for lower reservoir	Number of freezer blocks in lower reservoir
810 mls	0
685 mls	1
560 mls	2

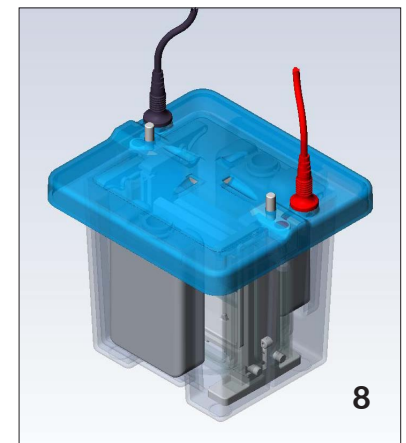


3. Pour only enough freshly prepared buffer into lower chamber so that the final buffer level (including freezer block displacement) is just below bottom of sample wells. Using a pipette or syringe, thoroughly flush out the wells in the glass plate sandwich with buffer. Load samples. If outer lanes do not contain sample, it is recommended that you run standards and/or fill outer lanes with loading buffer to reduce smiling and wrap-around effects.

4. Attach safety cover and turn on magnetic stirrer. The closed unit ready for power is shown in figure 8.



5. Connect the leads to the power supply, matching the color-coded red to red and black to black. **See Section 6.1 for recommended power conditions.** Begin separation by electrophoresis.



3.3 Removing the Gel



1. Turn the power supply off and disconnect the leads from the power supply. Remove the safety cover from the unit, by placing thumbs on white posts next to red & black connectors, then pushing down while pulling up with fingers under lid as shown in figure 9. **Do not remove safety cover by pulling up on leads!**
2. Pull up on gel door latches, and open gel door. Remove gel sandwich from Cassette Assembly. Stain and fix according to your preferred method.



SECTION 4

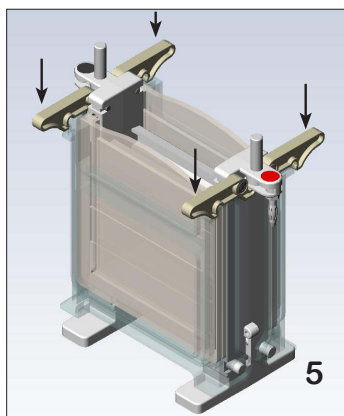
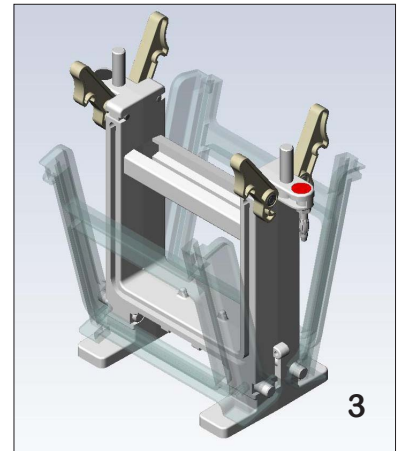
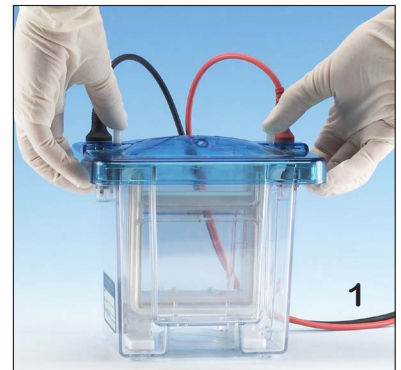
Alternate Protocol for Slab Gel Electrophoresis. (Not using Pre-cast gels)

4.1 Gel Casting Using Gel Wrap™ Gasket Casting Method (see pages 12-13)

4.2 Preparing the Electrophoresis Unit



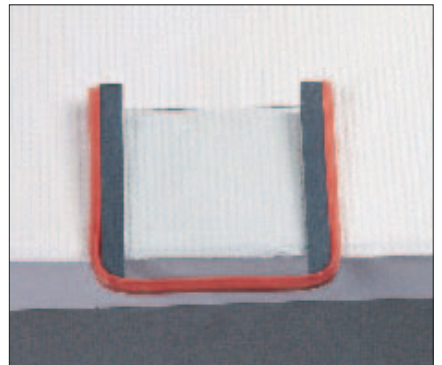
1. Place unit in authorized work area. Remove safety cover from the assembled unit by simultaneously pressing down on white push pins while lifting up on blue safety cover as shown in figure 1. **Do not remove safety cover by pulling up on leads!**
2. Remove white core from lower reservoir by grasping core with one hand and lifting directly up as shown in figure 2.
3. Open doors on the core assembly by pulling up on the white latches, as shown in figure 3.
4. Slide glass plate sandwich into the core assembly with the notched plate facing in towards the upper buffer reservoir as shown in figure 4.
5. If running one gel, slide white plastic adaptor plate into the side without the gel.
6. Close doors and relatch by pressing down on the white latches so that the assembly looks like that shown in figure 5.
7. Place stirring bar into bottom of reservoir in stirring corral (as shown in figure 7 on page 10).
8. If using freezer blocks take frozen blocks out of freezer and insert into receptacles on either side of lower reservoir.
9. For rest of protocol please refer to instructions on page 10 (Sections 3.2 and 3.3) for running the gel and removing it after electrophoresis.



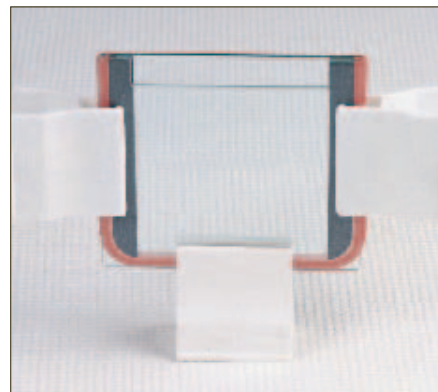
4.1 Alternate Protocol for Slab Gel Electrophoresis. (Not using Pre-cast gels) Gel Casting Using Gel Wrap™ Gasket Casting Method



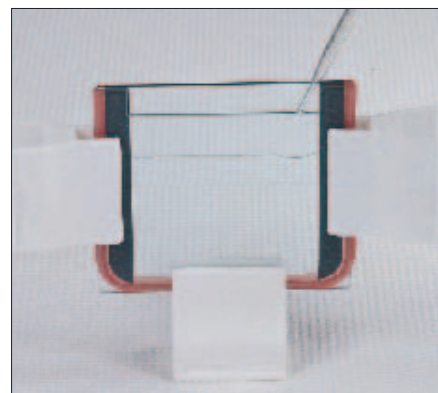
1. Place all components in an authorized work area. You will need: glass plate set, Gel Wrap™ Gasket, spacer set, comb, 3 GPC-0002 clamps, and polyacrylamide solution. Prepare and clean glass plates by hand washing both plates with a high quality lab detergent followed by a complete rinsing with dH₂O. Air-dry or use a lint-free tissue. Spray/wipe the chosen inner surfaces of the plate set with 95% ethanol and dry with lint-free tissue.
2. Start gel casting procedure by holding the 3mm thick, notched back plate with the rounded bottom corners and applying the gasket around one side of the glass plate. Note: one side of the “U” shaped gasket is flat, and the other side has tubing that will act as a seal around the spacers.
3. When applying the gasket over the rounded corners of the notched glass plate, make sure the cuts on the gasket align with the rounded corners of the glass plate. Once the gasket is pushed over the bottom edge and corners, work it down the remaining side.
4. Place the gasketed plate on the lab bench with the tubing side up, and extend the bottom of the plate over the edge of the bench, approximately ¾ of an inch. Place the spacers along side the inside edges of the gasket. Be sure the rounded corner end of each spacer is facing the outside bottom of the plate, following the radius of the glass.
5. Place the thinner unnotched back plate on top of the bottom assembly, starting from the bottom edge and gently easing the plate down. Verify the gasket is smooth around the edges and then clamp along the bottom.



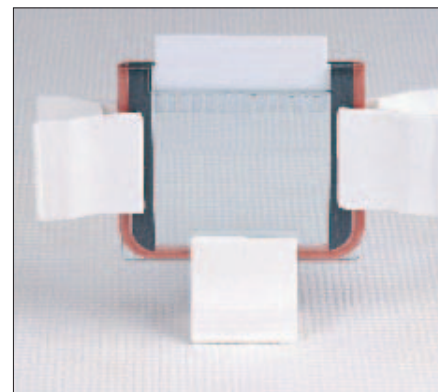
6. Lift the assembly and stand it on the base of the clamp. For leveling, push glass plate assembly down until it stops against clamp body. Clamp the sides of the assembly with additional casting clamps on either side. As each clamp is attached, be sure the gasket is aligned between the plates forming a seal.



7. Apply PAGE solution to gel plate sandwich using a syringe or pipette. If using a stacking gel, pour desired height of running gel, then overlay a small amount of dH₂O or 0.1% SDS solution to top of gel.



8. After polymerization, rinse with buffer, add stacking gel solution and insert comb. For regular, unit percentage gels, add polyacrylamide solution to correct height, and insert comb. Allow gel to set, usually 20 minutes. Extra gel solution in pipette or syringe can be monitored to test polymerization of gel mix.



9. Disassembly (see below). Hold the clamped plate assembly with one hand. Remove the gasket by starting at one of the top ends and pulling up and out on the gasket until it releases from the plate, up to the bottom of each of the white clamps. When each clamp is reached DO NOT remove it, instead feed the gasket down through the clamp body and repeat pulling up and out. Continue feeding until the gasket is fully detached. Once gasket is removed, detach clamps. If gel, is not to be used immediately, wrap entire plate sandwich with plastic wrap tightly to seal and store at 4°C for up to a month.



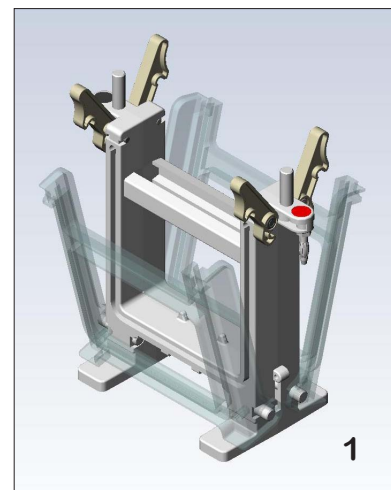
SECTION 5

Instructions for Western Blotting

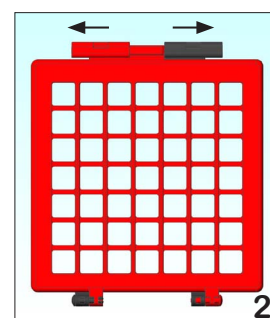
5.1 Preparing the Unit for Blotting



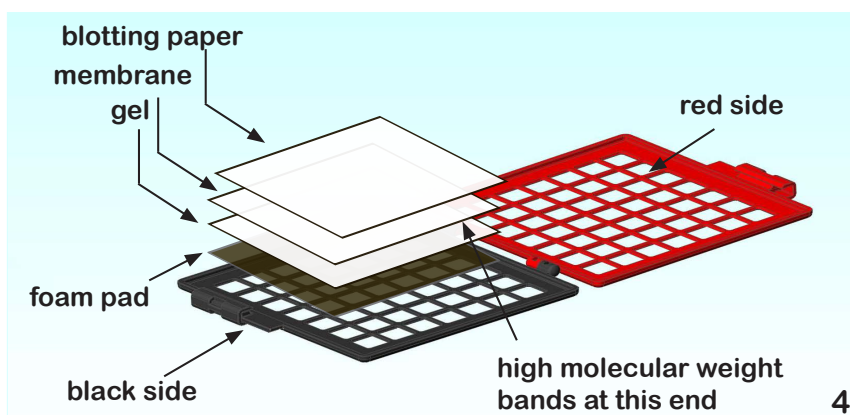
1. Remove safety cover from the assembled unit by simultaneously pressing down on white push pins while lifting up on blue safety cover. **Do not remove safety cover by pulling up on leads!** Remove white core from lower reservoir by grasping core with one hand and lifting directly up. Open doors on the core assembly by pulling up on the white latches, as shown in figure 1.



2. Open blotting cassette as shown in figures 2-3 and lay it flat on the bench.
3. Assemble blotting stack as shown in figure 3. With cassette wide open assemble components on black side in the following order: foam pad, gel*, buffer saturated transfer membrane, then buffer saturated blotting paper. Smooth with gloved finger or roll with glass rod to be sure no bubbles exist between the gel and the transfer membrane.

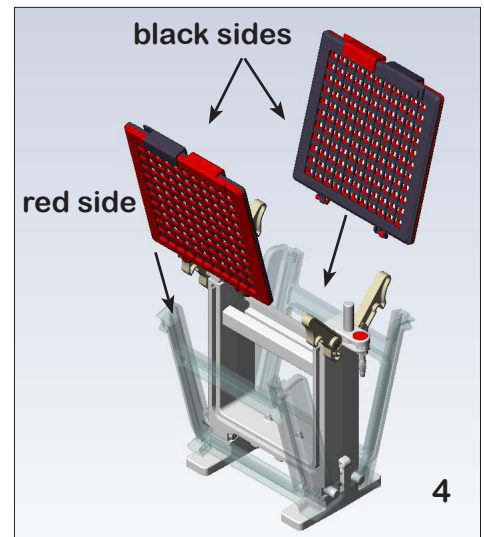


***Note:** to prepare gel for blotting, trim off wells and any excess acrylamide at the bottom, and invert 180° so that the large molecular weight proteins are at the bottom of the cassette. This puts them in contact with a stronger field strength and allows the blotting transfer to take place more efficiently.





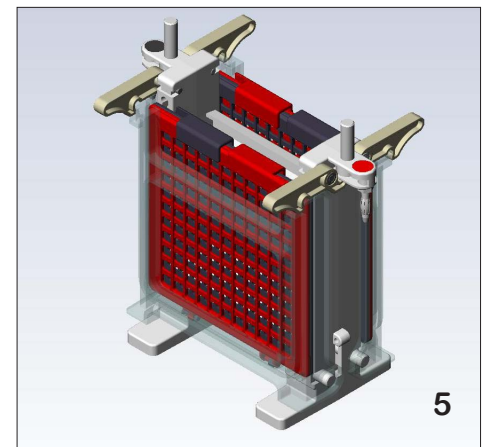
4. Insert blotting cassettes into core making sure that red side faces outward. See diagram 4.
5. Close doors and re-latch by pressing down on the white latches so that assembly looks like that shown in figure 5. If running one blot, slide white reservoir conversion plate into the side without the blotting cassette.



5.2 Electro- Blotting Procedure



1. Place stirring bar in bottom corral of lower reservoir. Place frozen freezer blocks in side receptacles. Place core/blotting cassette assembly into lower reservoir. The anode (red) and cathode (black) electrodes are color-coded on both the core/cassette assembly and lower reservoir. Ensure the red dot on the cassette assembly is on the same side as the red receptacle on the lower reservoir.
2. Pour 1 liter of freshly prepared, chilled (4°) buffer into lower buffer reservoir. Buffer will percolate into central core.
3. Attach safety cover. The unit should look as shown in figure 6 and is ready for power.

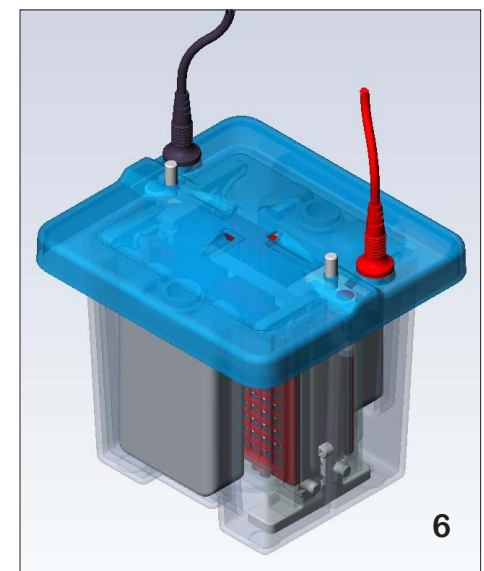


4. Connect the leads to the power supply, matching the color-coded red to red and black to black. **See Section 6.2 for recommended power conditions.** Begin transfer by electrophoresis.

5.3 Removing the Blot



1. Turn the power supply off and disconnect the leads from the power supply. Remove the safety cover from the unit, by placing thumbs on white posts next to red & black connectors, then pushing down while pulling up with fingers under lid. **Do not remove safety cover by pulling up on leads!**
2. Blotting cassettes can be removed by leaving the core in place and opening the top latches of the core, opening the doors and lifting the cassettes out. Unlatch the blotting cassettes and remove blot from blotting sandwich.



SECTION 6

Running Conditions

6.1 Recommended Power for Slab Gels:

Precise electrophoresis conditions will vary according to the number and type of gels used, buffer conditions employed, power input, and the general goal of the experiment. Refer to reference section 6.3 for in depth discussions on practical and theoretical approaches to protein gel electrophoresis.

6.1.1 ClearPAGE Gels



Run Voltage	Starting Current	Ending Current	Approx. Run Time
180VDC	90mA/gel	40mA/gel	30-75 minutes

6.1.2 General Recommendations

If running only one gel, keep the volts the same but reduce the mA's by half. Keep in mind that as the thickness of gel increases, the mA's increase proportionally.



At constant voltage, the proteins will migrate at a constant rate during electrophoresis with adequate heating appropriate for denaturing gels. Increasing the voltage/mA (for a single gel thickness and percentage) will speed mobility but increase the risk of overheating.

If using freezer blocks, the power input and the migration rate can be increased. The joule heating generated by the higher power is offset by the cooling effect of the buffer between the gels. Exact conditions should be determined empirically. We recommend using at least one freezer block for 2 reasons; less buffer usage and cooler buffer temperature. If using both freezer blocks, outside lanes can still be viewed through the corners of the tank. If it is important to view the entire gel during electrophoresis, use only 1 freezer block and place it at the back of the tank.

6.1.3 Tris-Glycine Gels

For SDS-PAGE Tris-Glycine (Laemmli) buffer systems with **two** 1.0mm thick gels at room temperature use the following conditions at constant voltage:



80VDC until samples have fully entered stacking gel
120VDC @ 60mA-90mA/gel (depending on gel type) thereafter until dye is near bottom of gel

6.2 Electro-Blotting

As a general recommendation, equilibrate gels (after running) with the diluted transfer buffer for 5 to 10 minutes before transfer.



Blotting Buffer	
ClearPAGE™ Transfer Buffer 10X/20X cat. # FB82500 (see Section 6.4)	100ml (1:10 dilution)
Methanol	200ml
Ultrapure water	720ml

Typical Blotting conditions for DCX-700	
Power Supply Setting	200V constant
Blot time	1.5 - 2.0 hours with stirring, cooling blocks
Expected current	180mA / 1 gel 220mA / 2 gels

6.3 References

- Hames, B.D. (ed.) (1998). *Gel Electrophoresis of Proteins. A Practical Approach*. 3rd edn. Oxford University Press, Oxford. Ch. 1,3.
- Sambrook, J., Fritsch, Russell, D. (2001). *Molecular Cloning. A Laboratory Manual*. 3rd edn. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York. A8.40-A8.55
- Ausubel, F.M., Brent, R., Kingston, R.E., Moore, D.D., Seidman, J.G., Smith, J.A., Struhl, K. (ed) (1993). *Current Protocols in Molecular Biology*. Vol. 2, Greene Publishing Associates, Inc. and John Wiley & Sons, Inc., Ch. 10.

6.4 Recommended ClearPAGE™ Buffer Formulations

As an alternative to the ClearPAGE buffers available for purchase, these formulations may be used to prepare buffers yourself. Use high-quality, low-conductance ingredients. Do NOT use acid or base to adjust the pH!

Standard SDS Running Buffer, 20X for Reduced Samples (FB60500)

* pH should be between 8.4 and 8.5 at 25° C.

Ingredient	MW	Molarity	Qty/Liter
Tricine (free acid)	179.17	0.8M	143.4 g
Tris (free base)	121.14	1.2M	145.2 g
SDS (2%)	288.38	-	20.0 g
Sodium Meta-bisulfite	104.06	50mM	5.0 g
Ultrapure water (fill to)	-	-	1000ml

* For non-reduced samples (especially antibodies), omit the Sodium Meta-bisulfite

Turbo SDS Running Buffer, 20X FB13500 * pH should be between 8.3 and 8.4 at 25° C.

Ingredient	MW	Molarity	Qty/Liter
MPS (free acid)	209.26	0.6M	125.6 g
Tris (free base)	121.14	1.2M	145.2 g
SDS (2%)	288.38	-	20.0 g
Sodium Meta-bisulfite	104.06	50mM	5.0 g
Ultrapure water (fill to)	-	-	1000 ml

* For non-reduced samples (especially antibodies), omit the Sodium Meta-bisulfite

LDS Sample Buffer, 4x -FB31010 *pH should be between 7.7 and 7.8 at 25° C.

Ingredient	MW	Molarity	Qty/Liter
Glycerol (40%)	-	-	400 g
Ficoll-400 (4%)	-	-	40 g
Triethanol amine, pH7.6	149.2	0.8M	120.0
6 N HCL	36.46	-	93.0 g
Lithium Dodecyl Sulfate (4%)	-	-	40 g
EDTA Di-Sodium	372.2	2mM	7.44 g
Brilliant Blue G250 (0.025%)	-	-	0.25g
Phenol Red	-	-	0.25 g
Ultrapure water (fill to)	-	-	1000 ml

Tris-Glycine-SDS Transfer Buffer (10X or 20X) & ClearPAGE™ Classics Run Buffer (20X) (FB82500)

* pH should be between 8.4 and 8.6 at 25° C.

Ingredient	MW	Molarity	Qty/Liter
Tris (free base)	121.14	0.25M	30.3 g
SDS (2%)	288.38	-	20.0 g
Glycine	75.07	1.92M	144.1 g
Ultrapure water (fill to)	-	-	1000 ml

Standard DNA/Native Running Buffer, 20X (GB61500) *pH should be between 8.35 and 8.45 at 25° C.

Ingredient	MW	Molarity	Qty/Liter
Tricine (free acid)	179.17	0.8M	143.4 g
Tris (free base)	121.14	1.2M	145.2 g
Ultrapure water (fill to)	-	-	1000ml

DNA/Native Sample Buffer, 4x (GB33002) * pH should be 7.6 at 25° C.

Ingredient	MW	Molarity	Qty/Liter
Glycerol (40%)	-	-	400 g
Ficoll-400 (4%)	-	-	40 g
Triethanol amine, pH7.6	149.2	0.8M	120.0
6 N HCL	36.46	-	93.0 g
EDTA Di-Sodium	372.2	2mM	7.44 g
Brilliant Blue G250 (0.025%)	-	-	0.25g
Phenol Red	-	-	0.25 g
Ultrapure water (fill to)	-	-	1000 ml

SECTION 7

Maintenance of Equipment

7.1 Care and Handling



The plastic components of the Dual Cool Electrophoresis System are fabricated from polycarbonate. Electrodes and connectors are made from pure platinum, stainless steel, and nickel plated brass. As with any laboratory instrument, adequate care ensures consistent and reliable performance.

After each use, rinse all parts with de-ionized water. Wipe dry with a soft cloth or paper towel, or allow to air dry. Whenever necessary, all components may be washed gently with water and a non-abrasive detergent, and rinsed and dried as above. *Never* use abrasive cleaners, glass cleaning sprays or scouring pads to clean the components, as these will damage the unit and components.

Additional precautions:

- Do not autoclave or dry-heat sterilize the apparatus or components.
- Do not expose the apparatus or components to phenol, acetone, benzene, halogenated hydrocarbon solvents or alcohols.
- Avoid prolonged exposure of the apparatus or components to UV light.
- Do NOT treat with diethylpyrocarbonate (DEPC)-treated water for extended periods at 37°C. A brief rinse with DEPC-water is sufficient after a thorough wash.

7.2 Maintenance



The following inspection and maintenance procedures will help maintain the safety and reliable performance of the Dual Cool Electrophoresis System. Replacement parts can be ordered by calling 1-858-755-4959 or by contacting your local distributor.

- Banana plugs and power cords should be inspected regularly. If the banana plugs become loose or do not feel friction tight replace the plugs or power cords.
- Should power cord assemblies (connectors, wire or shrouds) show any signs of wear or damage (e.g. cracks, nicks, abrasions, or melted insulation), replace them immediately.
- The platinum wire is secured to the banana jack by compression between a stainless washer and the jack nut. The nut/washer interface should be tight and free of corrosion.

SECTION 8

8.1 Ordering Information for Dual Cool Electrophoresis System

Part number	Description
DCX-700	Dual Cool System, CE. Fits precast gels or glass plate dimensions of 10x10 or 10x9cm(h). Kit includes: lower reservoir, safety cover with attached leads, core, 2 blotting cassettes with sponge pads, 2 freezer blocks, single gel adapter plate and instruction manual
Accessories	
EBX-BC-700	Accessory Blotting Cassette, includes sponge pad
EBX-SP-700	Accessory Sponge Pads (set of 4)
EBX-FB-700	Accessory Freezer Block
DCX-SP-109	Accessory Shim Plate for Cambrex 10x9 gel
DCX-AP-1010	Additional Single Gel Adapter Plate
Combs	
MVX-0701	Comb, 0.75mm x 1 well
MVX-1001	Comb, 1.0mm x 1 well
MVX-1501	Comb, 1.5mm x 1 well
MVX-0710	Comb, 0.75mm x 10 well
MVX-1010	Comb, 1.0mm x 10 well
MVX-1510	Comb, 1.5mm x 10 well
MVX-0714	Comb, 0.75mm x 14 well
MVX-1014	Comb, 1.0mm x 14 well
MVX-1514	Comb, 1.5mm x 14 well
Spacers	
DCX-S7510R	Gel Wrap Spacer Set, 0.75mm
DCX-S1010R	Gel Wrap Spacer Set, 1.0mm
DCX-S1510R	Gel Wrap Spacer Set, 1.5mm
Gel Wrap	
DCX-E7510	Gel Wrap Gasket, 0.75mm
DCX-E1010	Gel Wrap Gasket, 1.0mm
DCX-E1510	Gel Wrap Gasket, 1.5mm
Glass Plates	
DCX-P1010R	Gel Wrap Glass Plate Set, 10cm x 10cm

8.2 Ordering Information for Related Products

BLOTTERS	Description
EBX-700	4-Place Blotter, CE. Kit includes: lower reservoir, safety cover with attached leads, 4 blotting cassettes, 4 sponge pads, 4 freezer blocks, anode, cathode, and instruction manual
EBU-204	4-Place Blotter with cooling base, CE. Kit includes: lower reservoir, internal cooling base, safety cover with attached leads, 4 blotting cassettes, 4 sponge pads, 4 freezer blocks, anode, cathode, and instruction manual
Accessories	
EBX-BC-700	Accessory Blotting Cassette, includes sponge pad
EBX-SP-700	Accessory Sponge Pads (set of 4)
EBX-FB-700	Accessory Freezer Block
EBX-EA-700	Replacement Anode
EBX-EC-700	Replacement Cathode
Power Supplies	
EPS-200-II	HIGH CURRENT Mini Power Supply with timer, CV or CC, 5-200V, 110V/50-60Hz, current range: 2000mA, 200 Watts
EPS-200-IIV	HIGH CURRENT Mini Power Supply with timer, CV or CC, 5-200V, 220V/50-60Hz, current range: 2000mA, 200 Watts
EPS-300-II	Mini Power Supply with timer, CV or CC, 10-300V, 110V/50-60Hz, current range: 4-500mA, 90 watts
EPS-300-IIV	Mini Power Supply with timer, CV or CC, 10-300V, 220V/50-60Hz, current range: 4-500mA, 90 watts

CONTACT INFORMATION



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