INSTRUCTION MANUAL

Linear Gradient Makers

GM-20
GM-40
GM-100
GM-150
GM-200
GM-500
GM-1000
GM-2000

C.B.S. SCIENTIFIC
COMPANY, INC

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ENGLISH

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/lighting 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.

FRANÇAIS INFORMATION IMPORTANTE À L'USAGE DES UTILISATEURS

Le présent manuel d'utilisation explique la manière de se servir efficacement du produit en conditions de sécurité. Il est recommandé de soigneusement lire la totalité du manuel, avec ses consignes et ses instructions.

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.

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.

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.

GARANTIE ET RESPONSABILITÉ

Le produit a été fabriqué conformément aux normes applicables les plus exigentes en matière de matériaux, de main d'oeuvre, de conception et d'ingéniérie. 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.

C.B.S. Scientific garantit que le produit sera dépourvu de vices de matériaux et de main d'oeuvre, 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.

ESPAÑOL INFORMACIÓN IMPORTANTE PARA EL USUARIO

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.

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.

El símbolo del triángulo con rayo llama la atención del usuario a la posibilidad de riesgos eléctricos.

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 desenchufar 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.

GARANTÍA Y RESPONSABILIDAD

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.

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., libre de cargos, si se devuelve el producto a C.B.S. 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 subsecuentes, 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.

DEUTSCH WICHTIGE INFORMATION FÜR DEN BENUTZER

Diese Bedienungsanleitung beschreibt wie man dieses Produkt sicher und wirksam benutzt. Bitte lesen und befolgen Sie alle Anweisungen in dieser Anleitung.

Das Dreieck mit Ausrufezeichen weist den Benutzer des Produktes darauf hin, daß wichtige Bedienungs-, Wartungs- und/oder Garantievorschriften zu beachten sind.

Das Dreieck mit Zickzackblitz warnt den Benutzer des Produktes vor möglichen Gefahren durch elektrische Spannungen.

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.

GARANTIE UND HAFTUNG

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.

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ITALIANO INFORMAZIONI IMPORTANTI PER L'UTENTE

Questo manuale spiega come utilizzare questo prodotto in maniera sicura ed efficiente. Si pregai di leggere e seguire con cautela le istruzioni di ogni parte di questo manuale.

Il triangolo contenete il simbolo di un punto esclamativo avverte l'utente di importanti requisiti relativi al funzionamento, manutenzione e/o garanzia del prodotto.

Il triangolo contenete il simbolo di un lampo avverte l'utente del prodotto della possibilità di pericoli dovuti a corrente elettrica.

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.

GARANZIA E RESPONSABILITÀ

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.

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SECTION 1
General Information

1.1 Introduction

The C.B.S. Scientific line of linear gradient makers can be used to make reproducible gradients easily up to 2000mls total volume by filling each cylindrical chamber. Eight different sizes of linear gradient makers with side outlets are available. Gradient formation is controlled by a Teflon valve centered between the two chambers. Gradient flow rate is controlled either by the valve fitted on the outflow male luer adapter, or by a peristaltic pump.

1.2 Specifications

The smaller gradient makers (GM-20/40/100) have a support rod for attachment to a ring stand and come with 10, 20, or 50ml chambers per side (Fig. 1).

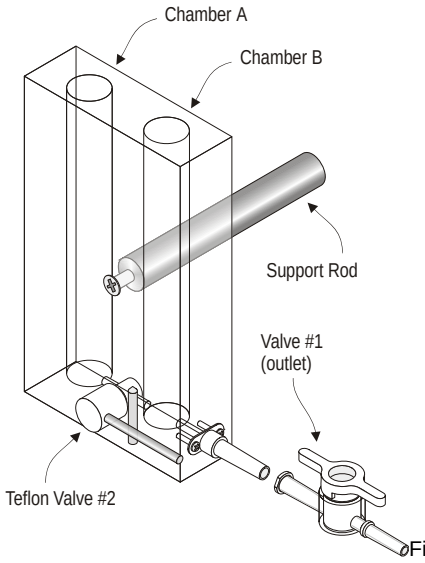

Figure 1

The larger sizes are available with 75,100, 250, 500 or 1000mls per chamber arranged side-by-side on a self-supporting base (Fig. 2).

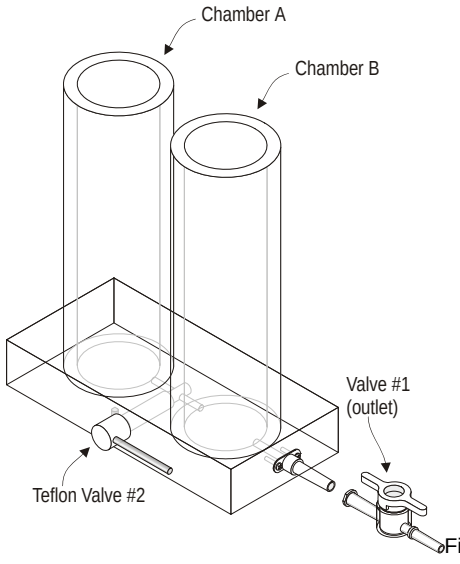

Figure 2

1.3 Safety

Be sure that all gradient makers are secure either by attaching support rod to a ring stand or mounting on a level surface.

SECTION 2
Description of Parts

2.1 Unpacking

Remove the gradient maker from the shipping container and place on a level surface in an authorized area. Verify that the catalog number on the gradient maker matches the packing list. Check for any damage which may have occurred during shipping. Contact C.B.S. Scientific customer service immediately if any damage is found.

2.2 Components/Assembly

The gradient makers consist of the acrylic/teflon mixing chamber made either from a solid block or tubing. Each gradient maker is supplied with an outflow control valve, which should be attached to the male luer adapter on the side of the base.

SECTION 3
Instructions for Use

3.1 Gradient Maker Preparation

1. Prepare gel sandwich and gel solutions as described. See Figure 3 for general set-up of the gel casting procedure.

Vertical Gradient Gel Casting using Gel Wrap, GM-40 gradient former and mini-pump

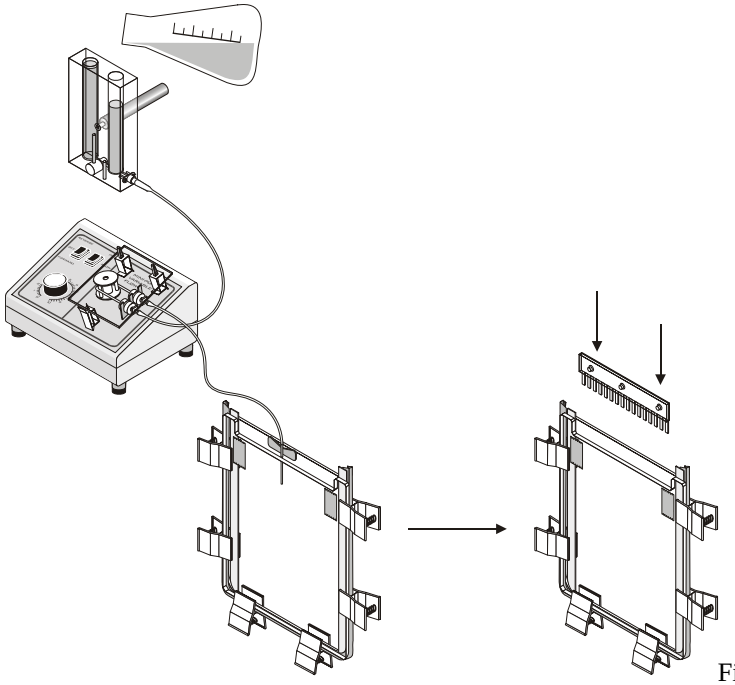

Figure 3

1. Assemble gel plate sandwich using Gel Wrap®.
2. Stand upright and level on two bottom casting clamps (GPC-0002).
3. Pump desired gradient into plate sandwich at medium speed. (Determine optimal speed empirically.)
4. Insert 16 well comb; allow time for polymerization.
5. Rinse cassette with d.i. H_2O. Remove comb.
6. Transfer sandwich to gel cassette; use GPC-0001 spring clamp. Leave gel wrap in place.
7. Displace bottom portion of Gel Wrap® from plate to allow lower (anodal) buffer contact with gel.

2. When using the 10ml, 20ml or 50ml chambers attach gradient maker to a ring stand support and drop a small magnetic flea or spin-bar into chamber on the right hand side ('B'). Ensure both valves are closed. Set up magnetic stirrer.

3. Outlet # 1 should be fitted with luer type valve and needle with attached tubing to deliver acrylamide mix to gel plate sandwich.

4. Pour solution 'B' into right side of gradient maker. Turn on magnetic stirrer so that it gently mixes the solution.

5. Open inside (middle) valve #2 to allow air bubble to escape. Allow approximately 1ml of solution 'B' to backflow into the left chamber. Remove with pipette and add back to right chamber B.

6. Add solution 'A' to left chamber of gradient maker.

7. Open valve #2 and, then, outside valve #1 to the pump.

8. Turn on peristaltic pump to drive the gel mix into the gel plate sandwich. The flow rate should allow the gel formation to be complete in 10-20 minutes.

9. Exit tube should be attached to near side of gel plate with tape.

10. When all of the gel mix has entered the gel plate sandwich, place the end of outlet tubing from valve #1 into a beaker and flush the chambers and tubing with distilled water so that acrylamide will not harden in the apparatus.

    Note: If gel volume is not enough to fill sandwich, use 0% to "top-off" if using the back side of the sawtooth comb for flat interface formation. If using water-saturated Butanol for overlay, leave a 0.5cm void to create a flat interface.

Gel size	**Spacers**	**Volume required**
16.5cm x 200mm	(yellow) 0.75mm	20mls (10.5mls per chamber)
16.5cm x 200mm	(red) 1.0mm	30mls (15.5mls per chamber)
16.5cm x 200mm	(blue) 1.5mm	40mls (21.0mls per chamber)

    When inserting the flat side of the sawtooth comb, be careful not to exceed 3/16" depth (about half of the tooth length). Otherwise, you will find it difficult to load your sample as there will not be enough "notch" left above the edge of the glass plate. Allow gel to polymerize for 20-30 minutes.

3.2 General Notes

In general, a gradient maker consists of two cylindrical chambers, with connecting channel between them. The two chambers may be arranged side by side or in a concentric arrangement. Each chamber differs according to which flow outlet or “valve” is connected to it. One flow valve is connected between the two chambers. The second flow valve is to be connected to tubing.

The gradient gel should be separated into two solutions; each one-half the final volume of the total gel volume. Each one-half volume should be the high and the low extreme of the gradient. For example, if the gradient is 20 to 50% UF and the total volume of the gel cast is 30mls, then a 15ml solution of 20% UF and 15mls of 50% UF should be prepared.

Make sure that the output tube is secured (tape) to the gel cast sandwich, ready for pouring. If the gel is to be poured by gravity, rather than by pumping, close valve #1.

First, identify which chamber is connected to the flow outlet that connects to the output tubing: this chamber holds the high gradient solution.

Next, ensure that the valve for the flow between the high and low chamber is closed. This valve should not be open until both solutions are poured. If it is opened before both solutions are poured, then the volume poured will have one half of its contents flow into the other chamber, equalizing the volume of solution in each chamber.

Pour one of the solutions into its appropriate chamber.

Flip the valve connecting the two chambers open and close very quickly (without pausing). This serves to get rid of any air bubbles that may be in the valve.

Pour the other solution into its appropriate chamber.

Open the valve connecting the two chambers.

Turn on the pump that controls the output. If the gel is poured through gravity, then open the valve on the output tubing.

If you are pouring a 2D gel, do not let the gel pour all the way to the top of the gel cast; otherwise, there will be no room to load your sample.

If you are doing a 1D gel, it may prove useful to leave 0.75mm of space at the top of the gel and add a neutral Polyacrylamide plug for the comb.

After pouring the gel, use a syringe to put some buffer at the top of the gel. This allows for the gel to settle and polymerize with a flat surface for loading. Disconnect the output tubing from the gel.

If there is excess solution, discard into a beaker through the tubing formerly connected to the gel.

When the gradient maker is empty, add water to clean out the remaining solution and left over polymerized patches.

After polymerization, transfer to gel apparatus for loading.

SECTION 4
Maintenance of Equipment

4.1 Care and Handling

Do not use organic solvents to clean the gradient maker. Use only deionized water. After each use, immediately pump deionized water through both chambers to clear residual acrylamide. Allow to air dry; do not use drying oven.

4.2 Maintenance

Replacement parts can be ordered by calling 1-858-755-4959 or by contacting your local distributor.

SECTION 5
Gradient Makers, Linear

Cat.#	Item
GM-20	Gradient Maker, 10ml per side, with side outlet
GM-40	Gradient Maker, 20ml per side, with side outlet
GM-100	Gradient Maker, 50ml per side, with side outlet
GM-150	Gradient Maker, 75ml per side, with side outlet
GM-200	Gradient Maker, 100ml per side, with side outlet
GM-500	Gradient Maker, 250ml per side, with side outlet
GM-1000	Gradient Maker, 500ml per side, with side outlet
GM-2000	Gradient Maker, 1000ml per side, with side outlet

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CONTACT US

Telephone:
Local or International
858-755-4959
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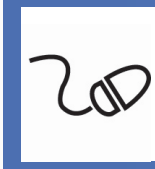

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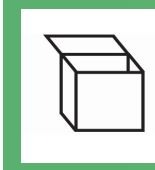

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