Criterion™ Cell

Instruction Manual

Catalog Number
165-6001

BIO-RAD

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Section 1
General Information

1.1 Introduction

The Criterion cell is a dedicated electrophoresis cell for running Criterion precast gels. The Criterion cell includes a tank with lower electrodes, a lid including power cables and upper electrode, and sample loading guides. The cell can run one or two gels.

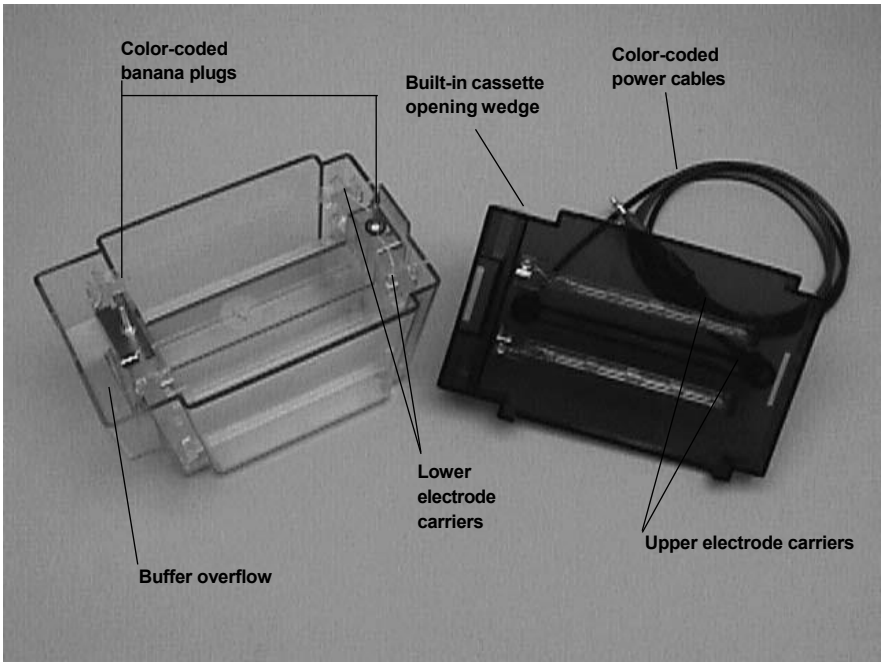

Fig. 1. Criterion Cell components.

1.2 Specifications

Tank	Polycarbonate
Upper electrode	Polycarbonate
Lower electrode	Polycarbonate
Lid	Polycarbonate
Sample loading guides	Polycarbonate
Overall size	22.3 x 14.4 x 19.5 cm (LxWxH)
Precast gel compatibility	Criterion Gels
Voltage limit	600 VDC and 400 watts
Weight	0.98 kg

Note: Criterion cell components are not compatible with acetone or ethanol. Use of organic solvents voids all warranties.

1.3 Safety

Power to the Criterion cell is supplied by an external DC voltage power supply (not included). The output of this power supply must be isolated from external ground to insure that the DC voltage output floats with respect to ground. All Bio-Rad power supplies meet this important safety requirement. Regardless of the power supply used, the maximum specified operating parameters for the Criterion Cell are as follows:

600 VDC	maximum voltage limit
400 watts	maximum power limit
50 °C	maximum ambient temperature limit

The current to the cell enters the unit through the lid assembly that provides a safety interlock to the user. The current to the cell and the lid's upper electrodes is broken when the lid is removed. Always turn off the power supply before removing the lid. **Do not attempt to use the cell without the safety lid.**

Important: This Bio-Rad product is designed and certified to meet *EN61010-1 safety standards. Certified products are safe to use when operated in accordance with the instruction manual. This instrument should not be modified or altered in any way. Alteration of this instrument will

- Void the warranty
- Void the EN61010-1 certification, and
- Create a potential safety hazard

Bio-Rad is not responsible for any injury or damage caused by use of this instrument for purposes other than those for which it is intended or by modifications of the instrument not performed by Bio-Rad or an authorized agent.

*EN61010-1 is an internationally accepted electrical safety standard for laboratory instruments.

Section 2
Set Up and Basic Operation

Criterion precast gel Cassette Preparation (see Criterion precast gel instruction manual for details)

1. Remove the Criterion gel cassette from the storage container.
2. Gently remove the comb and rinse the wells thoroughly with distilled water or running buffer.
3. Remove the tape from the bottom of the cassette.
4. Repeat for second Criterion gel.

5. Insert each Criterion gel into one of the slots in the Criterion tank. Ensure that the upper buffer chamber of the gel is facing toward the center of the cell.

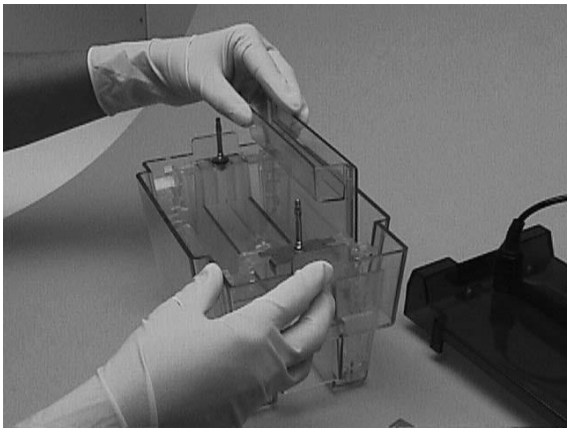

Fig. 2. Criterion Gel slides into slot in the Criterion Cell tank.

6. Fill the upper buffer chamber in each Criterion gel with 60 ml buffer.

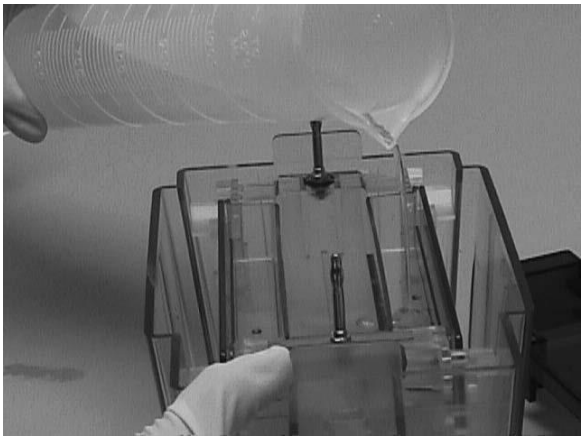

Fig. 3. Fitting upper buffer chamber of the Criterion Gel.

2.1 Sample Loading

1. Load the samples into the wells with a Hamilton syringe or a pipette using gel loading tips.
2. Use Bio-Rad's patented sample loading guides to locate the sample wells. Insert the Hamilton syringe or pipette tip into the slots of the guide and fill the corresponding wells.

Fig. 4. Outlined sample wells and sample loading guides take the guesswork out of samples loading.

Note: Load samples slowly to allow them to settle evenly on the bottom of the well. Be careful not to puncture the bottom of the well with the syringe needle or pipette tip.

3. Fill the tank to the line molded into the sides of the tank or the lower edge of the gels upper buffer chamber (approximately 800 ml). **It is important to fill the tank to the proper level to prevent overheating during running. If the tank is over-filled, buffer will/may overflow onto the bench.**

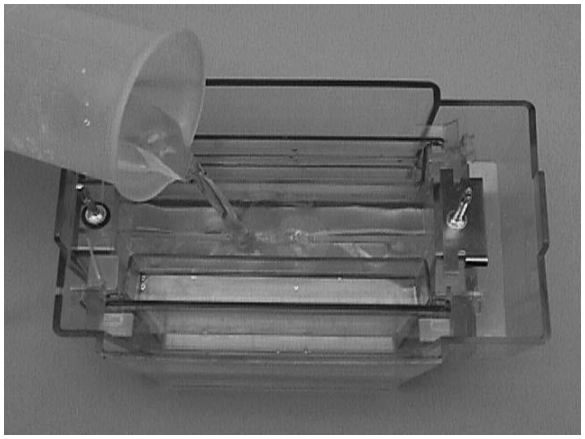

Fig. 5. Filling the Criterion Cell tank with buffer.

2.2 Power Conditions

1. Place the lid on the tank. Make sure to align the color-coded banana plugs and jacks according to color. A stop on the lid prevents incorrect orientation.
2. Insert the electrical leads into a suitable power supply with the proper polarity.

Apply power to the Criterion cell and begin electrophoresis; 200 volts constant is recommended for SDS-PAGE and most native gel applications. Run time is approximately 50–55 minutes at 200 volts for SDS-PAGE. Please see Criterion Gel instruction manual for more detailed running conditions of these and other Criterion gel types.

2.3 Gel Removal

1. After electrophoresis is complete, turn off the power supply and disconnect the electrical leads.
2. Remove the lid and carefully lift out the Criterion gel cassette. Pour off and discard the running buffer.
3. Repeat for second Criterion gel cassette if two gels were run.

4a. Use the cassette-opening tool built into the lid to break the weld-joint on the Criterion gel cassette(s). Place the Criterion gel cassette's upper buffer chamber over the built-in opening wedge of the lid. Push the cassette straight down until the upper edge of the upper buffer chamber contacts the top of the lid and the weld-joint at the top of the cassette is broken. Pull the two cassette halves apart.

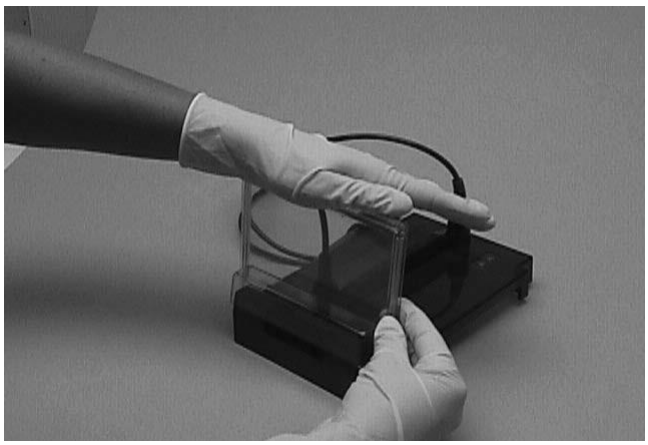

Fig. 6. Opening the Criterion Gel cassette after electrophoresis.

4b. An alternative method is to run the comb down the sides of the cassette to break the weld-joint and to pull the halves apart.

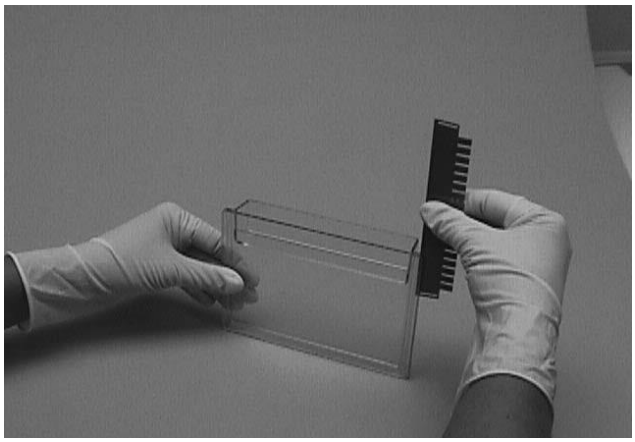

Fig. 7. Alternative method for opening Criterion Gel cassette after electrophoresis.

5. It is best to remove the gel by floating it off the plate. Invert the gel and plate under fixative or transfer solution and agitate gently until the gel separates from the plate.
6. Rinse the Criterion tank and lid with distilled, deionized water after use.

Section 3 Maintenance

Criterion tank and lid	Rinse thoroughly with distilled water after every use.

Section 4 Troubleshooting Guide

Problem	Cause	Solution
1. "Smile effect" - band pattern curves upward at both sides of the gel.	a. Center of the gel running hotter than either end.	a. Buffer not mixed well or buffer in upper chamber too concentrated. Remake buffer, insuring thorough mixing, especially when diluting 5x or 10x stock.
	b. Power conditions excessive.	b. Decrease power setting from 200 V to 150 V or fill lower chamber to the fill line on the tank.

	Problem	Cause	Solution
2.	Vertical streaking of protein.	a. Sample overload.	a. Dilute sample, selectively remove predominant protein in the sample, or reduce voltage by about 25% to minimize streaking.
		b. Sample precipitation.	b. Centrifuge sample before addition of SDS sample buffers, or decrease % T of resolving gel.*
			c. The ratio of SDS to protein should be enough to coat each protein molecule with SDS, generally 1.4:1. It may require more SDS for some membrane protein samples.
3.	Lateral band spreading.	a. Diffusion out of the wells prior to turning on the current	a. Minimize the time between sample application and power start up.
		b. Ionic strength of sample lower than that of gel.	b. Use some buffer in sample as in gel or stacking gel.
4.	Skewed or distorted bands.	a. Salts in sample.	a. Remove salts by dialysis, desalting column, etc.
5.	Lanes constricted at bottom of gel.	a. Ionic strength of sample higher than that of surrounding gel.	a. Desalt sample and neighboring samples.
6.	Run taking unusually long time.	a. Running buffer too concentrated.	a. Check buffer protocol, dilute if necessary.
		b. Excessive salt in sample.	b. Desalt sample.
7.	Run too fast, poor resolution.	a. Running or reservoir buffer too dilute.	a. Check buffer protocol, concentrate if necessary.
		b. Voltage too high.	b. Decrease voltage by 25-50%.
8.	Doublets observed where a single protein species is expected (SDS-PAGE)	a. A portion of the protein may have been reoxidized during the run or may not have been fully reduced prior to run.	a. Prepare fresh sample buffer solutions if over 30 days old; increase 2-mercaptoethanol concentration in the sample buffer.
9.	Observe fewer bands than expected and one heavy band at dye front.	a. Protein(s) migrating at the dye front.	a. Increase % T of resolving gel.*
		b. Protein degradation.	b. Use protease inhibitors, *e.g.* PMSF, etc.
10.	Diffuse Bands, poor resolution, irregular band pattern, inexplicable artifacts.	a. Overheating	a. Fill Criterion Cell tank to proper level.

Section 5
Product Information and Accessories

Catalog Number	Description
Criterion Cell	
165-6001	**Criterion Cell**, includes tank, lid with power cables, three Sample Loading Guides (12+2, 18, and 26 well), and instructions
165-6002	**Criterion Replacement Tank with electrodes**
165-6003	**Criterion Replacement Lid with electrodes**
165-6004	**Criterion Replacement Upper Electrode Carrier**, 2, includes pre-strung platinum wire
165-6005	**Criterion Replacement Lower Electrode Carrier**, 2, includes pre-strung platinum wire
165-2948	**Replacement Power Cables**
165-6006	**Criterion Sample Loading Guide**, 12+2 well, 1
165-6007	**Criterion Sample Loading Guide**, 18 well, 1
165-6008	**Criterion Sample Loading Guide**, 26 well, 1

Criterion Gels*

Criterion Tris-HCl Gels	12+2 comb	18 well comb	26 well comb	Prep+2 well Comb	IPG Comb
Theoretical well volumes	45 µl	30 µl	15 µl	800 µl	11 cm ReadyStrip IPG Strip
5% Tris-HCl	345-0001	345-0002	345-0003	345-0004	—
7.5% Tris-HCl	345-0005	345-0006	345-0007	345-0008	—
10% Tris-HCl	345-0009	345-0010	345-0011	345-0012	345-0013
12% Tris-HCl	345-0014	345-0015	345-0016	345-0017	345-0018
15% Tris-HCl	345-0019	345-0020	345-0021	345-0022	—
18% Tris-HCl	345-0023	345-0024	345-0025	345-0026	—
4–15% Tris-HCl	345-0027	345-0028	345-0029	345-0030	345-0031
4–20% Tris-HCl	345-0032	345-0033	345-0034	345-0035	345-0036
8–16% Tris-HCl	345-0037	345-0038	345-0039	345-0040	345-0041
10–20% Tris-HCl	345-0042	345-0043	345-0044	345-0045	345-0046
Criterion TBE Gels	12+2 comb	18 well comb	26 well comb	Prep+2 well comb	IPG comb
	45 µl	30 µl	15 µl	800 µl	

5% TBE	345-0047	345-0048	345-0049	345-0050	—
10% TBE	345-0051	345-0052	345-0053	345-0054	—
15% TBE	345-0055	345-0056	345-0057	345-0058	—
4–20% TBE	345-0059	345-0060	345-0061	345-0062	—

Catalog Number	Description
Premixed Running Buffers*	
161-0732	**10x Tris/Glycine/SDS**, 1L
161-0755	**10x Tris/Glycine/SDS**, 6 x 1L
161-0734	**10x Tris/Glycine**, 1L
161-0757	**10x Tris/Glycine**, 6 x 1L
161-0733	**10x Tris/Boric Acid/EDTA**, 1L
161-0756	**10x Tris/Boric Acid/EDTA**, 6 x 1L
Premixed Sample Buffer*	
161-0737	**Laemmli Sample Buffer**, 30 ml
161-0738	**Native Sample Buffer**, 30 ml
161-0767	**TBE Sample Buffer**, 30 ml

* Please see www.bio-rad.com for the most up-to-date product offerings.

Section 6
Warranty Information

The Criterion cell is warranted for 1 year against defects in materials and workmanship. If any defects should occur during this warranty period, Bio-Rad Laboratories will replace the defective parts without charge. However the following defects are specifically excluded.

1. Defects caused by improper operation.
2. Repairs or modifications done by anyone other than Bio-Rad Laboratories or their authorized agent.
3. Damaged caused by accidental misuse.
4. Damage caused by disaster.
5. Common replacement parts including platinum wire, and power cables.
6. Damage caused by the use of organic solvents.

For inquiry or request for repair service, contact your local Bio-Rad office.

Warranty Information

Model _____

Catalog Number _____

Date of Delivery _____

Serial Number _____

Invoice Number _____

Purchase Order No _____

Bio-Rad
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