Revised: October 30, 2024

Product Information

EMBER™ Ultra DNA Gel Kit

Unit Size: 10 or 30 gels per kit.

Kit Contents

Component	41043-T 10 gels*	41043 30 gels*
EMBER™ Ultra Precoated Agarose	99880-5g 1 x 5 g bottle	99880-15g 1 x 15 g bottle
EMBER™ Ultra DNA Loading Dye	99881-1mL 1 x 1 mL	99881-1mL 3 x 1 mL

*The number of gels per kit is based on a 9x11 cm, 1% agarose mini gel (0.5 g agarose in 50 mL buffer per gel). The actual number may vary depending on gel size.

Storage and Handling

Store EMBER™ Ultra DNA Loading Dye at -20°C. Store EMBER™ Ultra Agarose at room temperature. Protect both components from light. The kit components contain a potentially mutagenic DNA binding dye. Handle using universal laboratory safety precautions and dispose of gels as hazardous waste according to your local regulations.

Shake the bottle of EMBER™ Ultra Agarose to mix well before use. Warm the EMBER™ Ultra Loading Dye to room temperature and vortex to mix before use.

Product Description

The EMBER™ Ultra DNA Gel system provides the highest sensitivity and resolution for DNA among currently available agarose gel stains without the need for a post-electrophoresis staining step. Simply cast your agarose gel using the EMBER™ Ultra Precoated Agarose, and prepare your samples in the EMBER™ Ultra DNA Loading Dye. Bands can be imaged immediately after electrophoresis.

EMBER™ Ultra Precoated Agarose is ultra-pure molecular biology grade agarose with low electroendosmosis agarose precoated with Biotium's fluorescent EMBER™ nucleic acid dye. EMBER™ Ultra Precoated Agarose gives excellent results at percentages between 1% and 5% agarose, for analyzing different sizes of DNA. EMBER™ Ultra also has excellent sensitivity for single-stranded DNA and small DNA fragments. The dye will also detect RNA, but for best results with RNA, we recommend our EMBER™ Ultra RNA Agarose Gel Kit (see Related Products).

EMBER™ Ultra DNA Dye has green fluorescence with excitation/emission at 500/530 nm when bound to nucleic acids. For best results, we recommend imaging with a Biotium's Gel-Bright™ Laser Diode Gel Illuminator or a blue light illuminator. Gels can also be imaged using a UV transilluminator equipped with a SYBR® filter (recommended) or EtBr filter (with lower signal).

The EMBER™ Ultra DNA Loading Dye is specifically formulated to work with EMBER™ Agarose to provide superior sensitivity. The loading dye contains blue and orange tracking dyes that migrate at ~1500 bp (blue) and ~50 bp (orange) in a 1% agarose gel.

Experimental Protocols

Important: For best results, use the EMBER™ Ultra Precoated Agarose in combination with EMBER™ Ultra DNA Loading Dye. Using other loading dyes with EMBER™ Ultra Precoated Agarose, or using EMBER™ Ultra DNA Loading Dye with other gel types, will result in aberrant gel migration.

Materials required but not provided

- Suitable running buffer. EMBER™ Ultra Agarose is validated with 1X TBE, 1X TAE, and 1X Go-Go Fast™ electrophoresis buffers (see Related Products).

1. Gel casting

Note: We recommend melting the agarose and casting the gel on the day of use.

1.1 Shake the closed bottle of EMBER™ Ultra Precoated Agarose to thoroughly mix the powder.

1.2 Weigh out the EMBER™ Ultra Precoated Agarose for the desired gel percentage as shown below. The DNA size ranges are to be used as a general guide only, optimal separation may vary depending on the specific type of DNA sample.

DNA fragment size	Gel percentage	Agarose per 50 mL
800-12,000 bp	0.8%	0.4 g
500-10,000 bp	1%	0.5 g
400-7000 bp	1.2%	0.6 g
200-3000 bp	1.5%	0.75 g
50-2000 bp	2%	1 g
10-300 bp	5%	2.5 g

1.3 Add the agarose to 1X gel running buffer (TBE, TAE, or Go-Go Fast™) in an Erlenmeyer flask that is large enough to allow the solution to boil (for example, use a ≥125 mL flask to make 50 mL of molten agarose).

Notes: Do not add any additional fluorescent dye to the agarose.

1.4 Microwave for 1 minute, swirl to mix thoroughly, and microwave for an additional minute.

Caution! Handle heated solutions of agarose with care to avoid boiling over and the risk of burns.

1.5 Swirl to mix and make sure agarose is completely dissolved.

1.6 Allow the solution to cool for ~1 minute.

1.7 Pour the gel and insert the comb.

1.8 Allow the gel to set and cool completely before removing the comb.

2. Sample preparation and electrophoresis

2.1 **Recommended sample loading amounts:** Avoid overloading samples, which may result in distorted bands. Dilute your DNA samples in nuclease-free water or TE buffer if necessary.

- For blue light illuminator (Biotium's Gel-Bright™ Laser Diode Gel Illuminator, Thermo's Safe Imager™, or similar): Load 20-100 ng DNA per 1 mm gel lane.
- For use with a UV transilluminator with SYBR® filter: Load 50-200 ng DNA per 1 mm gel lane.
- For samples of unknown concentration: Use 1-5 uL of sample as a starting point for optimization.

2.2 Warm the EMBER™ Ultra DNA Loading Dye to room temperature and vortex to mix thoroughly before use.

2.3 Add 1 uL of EMBER™ Ultra DNA Loading Dye for every 5 uL of DNA sample and mix well by pipetting up and down or brief vortex.

Note: Use EMBER™ Ultra DNA Loading Dye in all of your samples, including DNA ladders. The loading dye may be added to samples already containing another DNA loading dye, such as Ready-to-Use DNA Ladders.

2.4 Briefly centrifuge samples to collect the contents at the bottom of the tubes.

2.5 Load the entire sample volume on the gel.

2.6 Run the gel in the same buffer type used for casting.

2.7 Image the gel on a blue light gel illuminator or UV transilluminator with a SYBR® filter.

Troubleshooting

Problem	Solutions
Distorted Bands	• Avoid overloading samples. See loading recommendations under "Sample preparation and electrophoresis." • Only use EMBER™ Ultra Precoated Agarose together with EMBER™ Ultra DNA Loading Dye. Using EMBER™ Ultra components in combination with other types of agarose or loading dyes will result in distorted bands.

Related Products

Cat. No.	Product
E90005	Gel-Bright™ Laser Diode Gel Illuminator
41044	EMBER™ Ultra RNA Gel Kit
41039	Go-Go™ Fast DNA Gel Running Buffer, 50X
22031	1X TAE (1L) Buffer Powder Packets
41006	TBE Buffer, 5X
41041-41042	Precast GelRed® Agarose Gels, 1% Agarose/TAE
31084	Ready-to-Load 1 kb DNA Ladder
31085	Ready-to-Load 100 bp DNA Ladder
31030	DNA Gel Extraction Kit
31080	1 kb DNA Ladder in TE Buffer
31081	100 bp DNA Ladder in TE Buffer
31069	AccuGreen™ Broad Range dsDNA Quantitation Kit
CD507	CELLDATA DNAstorm™ 2.0 FFPE DNA Extraction Kit
CD508	CELLDATA DNAstorm™/RNAstorm™ 2.0 Combination Kit
CD509-96	CELLDATA DNAstorm™ 2.0 MagBead FFPE DNA Extraction Kit
CD510-96	CELLDATA RNAstorm™ 2.0 MagBead FFPE RNA Extraction Kit
41024-4L	Water, Ultrapure Molecular Biology Grade
31041	Forget-Me-Not™ EvaGreen® qPCR Master Mix (2-Color Tracking)
31043	Forget-Me-Not™ Universal Probe qPCR Master Mix
41028	Agarose LE, Ultra-Pure Molecular Biology Grade
41011	GelRed® Prestain Plus Loading Dye
41029	GelRed® Agarose LE
41030	GelGreen® Agarose LE
41003	GelRed® Nucleic Acid Gel Stain, 10,000X in Water
41005	GelGreen® Nucleic Acid Gel Stain, 10,000X in Water

Please visit our website at www.biotium.com for information on our products for DNA workflows and applications, including DNA extraction kits specially formulated for FFPE tissues, DNA quantitation kits, and DNA gel stains.