Quick Guide - Horizontal Gel Electrophoresis Systems - Biometra Compact Line

Compact XS/S, Compact M, Compact L/XL, Compact Multi-Wide

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An Endress+Hauser Company

Safety instructions

For the use of the devices, it is mandatory to refer to the detailed manual. **Observe the safety instruction of the manuals.** This Quick Guide only contains the most important device parameters and application tips.

Device and application parameters

Parameter	Compact XS/S	Compact M	Compact L/XL	Compact Multi-Wide
Maximum Operating Parameters				
Voltage (VDC)	180	180	250	180
Current (mA)	200	250	500	250
Power (Watt)	12	20	30	20
Buffer temperature (°C)	50	50	50	50
Recommended Application Voltages				
Voltage* (VDC)	85	108	170	125

*equal to 5V/cm electrode distance

Notice: Hot agarose (> 60 °C) may cause the tray craze and will decrease the lifetime of the tray.

Electrophoresis Buffer Heating Effects

Electrophoresis at high voltages generates heat, and high conductivity buffers such as TAE generate more heat than low conductivity buffers. Caution should be exercised in agarose gel electrophoresis at > 175 V. Heat build-up can cause gel artifacts such as S-shaped migration fronts, and in prolonged electrophoresis, can melt the agarose gel. Low-melting-point agarose gels should never be electrophoresed at high voltages.

Gel Concentration

Prepare an agarose solution according to the fragment sizes to be separated. The table gives an overview about the suggested agarose concentrations.

Agarose concentration (%)	DNA fragment size(Kb)	Recommended buffer
0.5	1 to 30	TAE
0.7	0.8 to 12	TAE
1.0	0.5 to 10	TAE
1.2	0.4 to 7	TBE
1.5	0.2 to 3	TBE
2.0	0.2 to 3	TBE
3.0	0.1 to 3	TBE

TAE: Tris-acetate/EDTA; TBE: Tris-borate/EDTA

Gel Volume Requirements

Prepare an appropriate volume of agarose solution. The prepared volume should be a bit larger than the required gel volumes per tray.

The type of buffer used for the preparation of the gel solution should always be the same as the running buffer in the buffer tank!

Model	Gel size [cm]	Gel volume for 0.5 cm thick gel [mL]
Compact XS	8.2 x 7.1	30
Compact S	8.2 x 10.5	44
Compact M	12.4 x 14.5	91
Compact L	23.9 x 20.0	240
Compact XL	23.9 x 25.0	300
Compact Multi-Wide	15.0 x 7.0	54
	15.0 x 10.0	76
	15.0 x 15.0	114
	15.0 x 18.0	135

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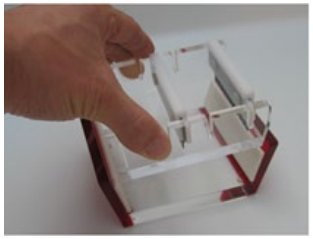
Casting the Gel

1. Add the appropriate amount of powdered agarose to a measured quantity of electrophoresis buffer in an Erlenmeyer flask. Heat it in a boiling water bath or microwave oven until the agarose is completely dissolved. Distilled water may have to be added to replenish what has boiled off.
2. Cool the solution to 45 °C - 60 °C.
3. Insert the gel tray into the gel casting system:

Compact XS/S/M:

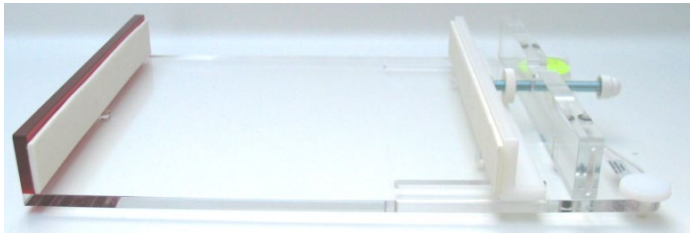


Insert the tray into the specific casting tank and press the tray with light pressure down until it is horizontally fixed between the tank sealings.

Compact Multi-Wide and Compact L/XL:

There are different slider positions for the different tray sizes. The slider can easily be set to the required position by lifting the slider and plugging in the new position.

Casting system L/XL with slider position for tray L



Casting system L/XL with slider position for tray XL

4. Place the comb(s) into the appropriate slot(s) of the tray.
5. Pour the 45 °C TO 60 °C warm agarose solution onto the gel tray.
   Recommended gel height is 5 mm.
   Check that there no air bubbles under or between the teeth of the comb.

Notice: Hot agarose (> 60 °C) may cause the tray craze and will decrease the lifetime of the tray.

6. After 30 to 45 min at room temperature the gel should be solidified.
7. Carefully remove the tray from the casting system.
8. Place the tray in the electrophoresis chamber so that the comb slots are near to the cathode (black). DNA samples will migrate toward the anode (red) during electrophoresis.
9. To prevent drying of the gel and ensure an even voltage gradient across the gel bed, submerge the gel with electrophoresis buffer to a depth of only 1 to 2 mm.

Notice: Do not exceed the maximum buffer fill line graved at the chamber wall.

10. Carefully remove the comb(s) and if necessary, adjust the buffer layer according to 9.

Dyes for Sample Loading

Bromophenol blue migrates through agarose gels approximately 2.2-fold faster than xylene cyanol FF, independent of the agarose concentration (range 0.5 % to 1.4 %).
Bromophenol blue migrates in 0.5x TBE at approximately the same rate as linear double-stranded DNA 300 bp in length.
Xylene cyanol FF migrates at approximately the same rate as linear double-stranded DNA 4 Kb in length.

Nucleic Acid Staining

A usual method to visualise DNA in agarose gels is staining with the fluorescent dye ethidium bromide.

Place the gel into an appropriate volume of 0.5 µg/mL ethidium bromide stain for 15 to 30 min. The staining solution should cover the whole gel.

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