

Improve Gel Loading for PCR Analysis with Adjustable Tip Spacing Electronic Pipettes

Liquid Transfer Application Team

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Key Words

Gel loading, Agarose gel, Adjustable tip spacing, E1-ClipTip Electronic Equalizer Adjustable Multichannel Pipette, Manual mode

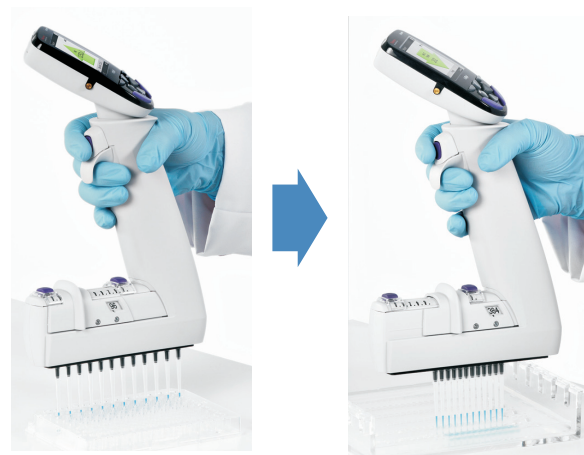
Introduction

Agarose gel electrophoresis is a widely used method for analyzing PCR-products and separating DNA or RNA fragments. Transferring samples from microcentrifuge tubes or microplates to agarose gels is one of the most time consuming pipetting applications in molecular biology laboratories. Many researchers choose to use manual single channel pipettes for gel loading to have more versatility in applications, which can prove to be tedious and time consuming. Choosing a multichannel pipette would dramatically accelerate the process and decrease the risk of pipetting errors, however standard 96-format multichannel pipettes often do not fit into different gel and microplate formats.

Thermo Scientific™ E1-ClipTip™ Electronic Equalizer Multichannel Pipettes feature adjustable tip spacing allowing pipette tips to fit a wide variety of labware formats where traditionally only single channel pipettes (SCP) could be used (Table 1). This makes it possible to transfer multiple samples between different lab formats at one time, saving time and repetitions as well as enabling easy sample tracking. In addition, the manual operation mode of the E1-ClipTip pipettes provides controlled pipetting action designed to help ensure precise and efficient gel loading without sample escaping from the wells.

Load multiple samples at once

With adjustable tip spacing users can adjust the spacing between the pipette tips simply by sliding the adjuster scale to expand or contract the tip spacing to the desired format. Instead of dispensing well by well, a row of 8 or 12 wells can be processed in parallel. In this way the repetition of arm movements from the source plate or tube to the gel is minimal. This can result in less pipetting errors due to reduced user fatigue and repetitions.



The E1-ClipTip Adjustable Tip Spacing Equalizer pipette allows multiple samples to be transferred between different labware formats and agarose gels at once.

From	Tip/Well Spacing (mm)	➤	To	Tip/Well Spacing (mm)
PCR-tube strip	9	➤	Agarose gel with non-standard spacing	4.5 – 14.2
96-well PCR-plates	9	➤	Agarose gel with 384-well spacing	4.5
96-well PCR-plates	9	➤	96-well PCR-plates	4.5 – 14.2
384-well plates	4.5	➤	Agarose gel with 96-well spacing	9

Table 1. Examples of labware formats and agarose gels that can be used for sample transfers with the E1-ClipTip Equalizer pipette.

Time needed to load agarose gel from a 96-well Piko plate

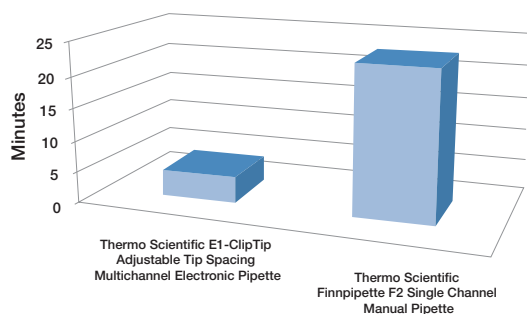


Figure 1: Sample transfer from a 96-well Piko PCR plate to a gel.

Using an E1-ClipTip Equalizer 8-channel 384-format pipette and a traditional manual single channel pipette in reverse pipetting mode, 5 µl samples were transferred from a Thermo Scientific™ Piko™ PCR plate to an agarose gel. The wells of the plate were in a 6 x 16 format with a well-to-well spacing of standard 384-well microplates. The time needed to transfer samples from the entire plate to the gel was recorded. Completing the task by using the E1-ClipTip pipette system with the manual function took 80% less time when compared to a manual single channel pipette.

Secure and strain free loading

The innovative ClipTip interlocking technology is designed to lock and seal the tips in place preventing tips from falling off or leaking during the loading process. This saves precious time on repeating the loading or preparing the lost samples. The index finger activated trigger combined with the electronic tip ejection of the E1-ClipTip, reduces strenuous thumb movements needed to press and depress the plunger of a manual pipette. Less motions, and secured tip attachment combined with light operation will make gel loading with the E1-ClipTip an efficient and comfortable experience.

Prevent sample escaping from the wells

The manual function in the E1-ClipTip Electronic pipette offers ideal control over the pipetting motion which makes it an excellent option for applications where liquid flow needs to be monitored carefully. Liquid is dispensed as long as the trigger is kept pressed, and stopped immediately when it's released. For added sensitivity, the manual mode has lower aspirating and dispensing speeds than in other pipetting modes. A low dispensing speed helps to fill the wells of a gel uniformly. This together with a controlled pipetting action gives better control than dispensing with manual pipettes. The use of an electronic pipette also reduces the variations created by multiple users.

Summary

Loading an agarose gel is a time consuming, and demanding task that requires slow and precise dispensing of small volumes with highly viscous liquids. If your daily pipetting includes transferring samples from a variety of labware formats onto gels, then the E1-ClipTip Equalizer will significantly increase your research efficiency due to the reduction in pipetting motions. This test showed that you can save up to 80% of the typical time required to load gels when using a single channel manual pipette with the new E1-ClipTip Adjustable tip spacing multichannel electronic pipette. In addition to saving time, there is a significant reduction in user fatigue thanks to index finger operation, electronic tip ejection, and less repetitions overall which leads to fewer pipetting mistakes. Combined with ClipTip interlocking technology that eliminates the possibility of losing any precious samples during the loading process, the E1-ClipTip Equalizer pipettes offer increased efficiency and quality in various gel loading applications.

Learn more at www.thermoscientific.com/clipitip

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