

Accelerate Liquid Transfers Between Different Labware Formats



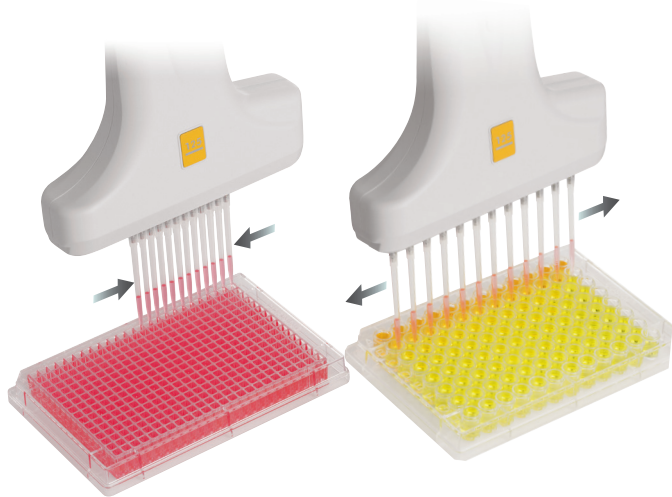
The challenge of transferring samples between different labware formats

Many laboratory applications require liquid transfers between various labware formats. Due to varying requirements in their sample processing, different labware vessels are typically used for sample storage, processing and analysis tasks. Traditional multichannel pipettes were not designed to accommodate this wide variety of labware formats because their tip-to-tip spacing is optimized for use with standard 96 well microplates. To overcome this limitation researchers are forced to use single channel pipettes to perform liquid sample transfers between different labware. Although a single channel pipette offers the

versatility to cope with this task, it lacks the throughput performance. Also, single channel pipettes are more error prone and time-consuming to work with because more transfer steps are required compared to a multichannel pipette.

The VOYAGER pipette offers a solution to this problem. It features electronic adjustable tip spacing, enabling the pipette to optimally access almost any labware by the touch of a button. The VOYAGER can adjust its tip spacing anywhere between 4.5 mm and 33 mm.

Benefits of electronic adjustable tip spacing



The VOYAGER is the only pipette where the tip spacing can be changed electronically.

One of its greatest benefits is that the spacing can be conveniently changed as you are pipetting using only a single hand. Simply by pushing a button the tips assume the required spacing, leaving your other hand free to handle the sample vessel. Benefiting from a high precision motor, the VOYAGER tip movement can be exactly controlled and the required tip-to-tip spacing for your lab protocols saved for future repeat use. Up to three different tip-to-tip spacings can be saved and later be accessed anytime during a pipetting protocol. There is no need to note down or remember the specific tip-to-tip distances for your favourite protocols.

Labware compatibility

The possible minimum and maximum tip-to-tip spacing depends on the number of channels and the nominal volume of your VOYAGER pipette.

The total width of the pipette is always the same, independent of the number of channels (4, 6, 8 or 12) it has. Making the pipette bigger to achieve a wider tip-to-tip spacing would make it heavier and therefore less practical to work with. The VOYAGER 4 channel pipette thus offers the widest tip-to-tip spacing (up to 33 mm) available on the market, allowing it to even handle pipetting to and from 12-well cell culture plates and wide spaced tube racks.

The minimum tip spacing depends on the volume of your chosen VOYAGER pipette. A small volume pipette has smaller tips with smaller diameters. This allows for a minimal tip spacing of 4.5 mm compared to larger volumes which are restricted to 9 mm minimal tip spacing. All VOYAGER pipettes with nominal volumes of 12.5 µl, 50 µl and 125 µl feature a minimum tip spacing of 4.5 mm enabling them to precisely handle liquid transfers to and from 384 well microplates.

The following table shows all available VOYAGER pipettes, the range of tip spacing they offer and the labware formats for which they provide optimum capabilities.

Model	Volume	Spacing (min to max)	384 wells	96 wells	48 wells	24 wells	12 wells
			4.5 mm well to well	9 mm well to well	14 mm well to well	19 mm well to well	26 mm well to well
4 Channel	300 µl, 1250 µl	9 - 33 mm		✓	✓	✓	✓
6 Channel	300 µl, 1250 µl	9 - 19.8 mm		✓	✓	✓	
8 Channel	300 µl, 1250 µl	9 - 14 mm		✓	✓		
8 Channel	12.5 µl, 50 µl, 125 µl	4.5 - 14 mm	✓	✓	✓		
12 Channel	12.5 µl, 50 µl, 125 µl	4.5 - 9 mm	✓	✓			
			Agarose gels		Microcentrifuge tube racks	Test tube racks Culture tubes	Large sample tubes and racks

Popular applications requiring adjustable tip spacing

VOYAGER pipettes can be used for any application involving liquid transfers to or from sample tubes, microplates of different well formats and even agarose gel pockets.

In the following section we explain how the VOYAGER adjustable tip spacing pipettes will increase your productivity exemplary in four popular applications.

Screening Compound Libraries

Screening of small compound libraries may involve two-way transfer of liquids between tubes and plates. In the illustrated example, liquid samples are transferred from 1.5 ml microcentrifuge tubes to a target 96 well microplate and then back to tubes.

For these transfers the VOYAGER pipette alternates between two different tip spacings: 13 mm for the standard 1.5 ml microcentrifuge tube rack and 9 mm for the 96 well microplate.



Source/Target	1.5 ml microcentrifuge tube	96 well plate	1.5 ml microcentrifuge tube
Tip-to-tip spacing	13 mm	9 mm	13 mm
Compatible VOYAGER :	4, 6 and 8 channel: all volumes		

Typical time gain versus using standard single channel pipette = **8 times faster**

PCR Genotyping Assay

In this application individual master mixes are typically prepared in a set of tubes and the templates are stored in another set of tubes. Using the VOYAGER pipette, the master mix and templates are easily transferred from the tubes into a 96 well PCR plate. Depending on the tube size, the VOYAGER needs to be

set to 13 mm tip spacing (standard 1.5 ml microcentrifuge tube rack) or 9 mm (for 0.2 ml tubes). After running the PCR reaction, the samples are loaded onto the gel. The VOYAGER pipette can be adapted to almost any gel pocket distance. Usually, tip spacing for different gel pockets varies between 4.5 mm and 12 mm.



Source/Target	1.5 ml microcentrifuge tubes and 0.2 ml PCR tubes	96 well PCR plate	Agarose gel
Tip-to-tip spacing	13 mm and 9 mm	9 mm	Between 4.5 mm and 12 mm
Compatible VOYAGER :	4, 6 and 8 channel: all volumes		

Typical time gain versus using standard single channel pipette = **8 times faster**

qPCR Assays

Our chosen qPCR assay is run in a 384 well plate. The master mix is prepared in a 1.5 ml microcentrifuge tube from which it is then transferred to a low dead volume reagent reservoir. Using a VOYAGER 8 or 12 channel pipette, the master mix can be efficiently transferred in repeat dispense mode to the target 384 well PCR plate. A repeat dispense mode is one of the big advantages of electronic pipettes. Following a single aspiration step, it allows you to dispense multiple aliquots.

The templates are then stored in bar coded storage tubes arranged in the standard 96 well format requiring 9 mm tip-to-tip spacing. From these tubes the templates are transferred in triplicates to the 384 well PCR plate that requires a tip-to-tip spacing of 4.5 mm. This multi-step task is easily accomplished using a VOYAGER 12 channel 50 µl pipette and dispensing the triplicates in repeat dispense mode.



Source/Target	Sample storage tubes	384-well PCR plate
Tip-to-tip spacing	9 mm	4.5 mm
Compatible VOYAGER :	8 and 12 channel: 12.5 µl, 50 µl and 125 µl	

Typical time gain versus using standard single channel pipette = **12 times faster**

Cell Seeding

Often cells are grown in large well plates, such as 12 well cell culture plates. These cells are then seeded onto a 96 well plate for sample incubation.

The 4 channel VOYAGER 1250 µl pipette is ideal for cell culture work. In this application, the tip-to-tip spacing is set to 26 mm which corresponds to the well-to-well distance of most 12-well

plates. To transfer samples to the target 96 well plate, the tip-to-tip spacing on the 4 channel VOYAGER is closed to 9 mm.

The VOYAGER pipettes offer 10 different pipetting speeds, allowing them to dispense cells at low speeds in order to maintain their viability. With repeat dispense the cells are distributed efficiently to a target 96 well plate.



Source/Target	12 well plate	96 well plate
Tip-to-tip spacing	26 mm	9 mm
Compatible VOYAGER :	4 channel: 300 µl and 1250 µl	

Typical time gain versus using standard single channel pipette = **4 times faster**

Conclusion

Based on four popular applications undertaken using VOYAGER pipettes we have been able to show the considerable workflow benefits of having a pipette with electronic adjustable tip spacing.

Using VOYAGER electronic adjustable tip spacing pipettes the number of transfer steps, compared to using single channel pipettes, can be significantly reduced. This also results in considerable time savings and less error prone sample processing.

Using a VOYAGER pipette, your pipetting protocols can be finished up to 12 times faster than with a traditional single or multichannel pipette. Benefiting from a high precision motor, the VOYAGER electronic tip movement can be exactly controlled and the required tip-to-tip spacing for your lab protocols saved for future repeat use.



Watch a video demonstrating the VOYAGER adjustable tip spacing pipette on our website:
<https://www.integra-biosciences.com/en/electronic-pipettes/voyager-ii#see-it-work>