

Fast and efficient sample transfer from plate to plate with INTEGRA's electronic pipettes

Introduction

The transfer of samples between same (e.g. from 96 well to 96 well plate) or different plate formats (e.g. from 96 well to 384 well plate) is a common process in life science applications, from cell culture, seeding and staining to drug testing, PCR, protein analysis and nucleic acid purification. However, it is a slow, tedious and highly error prone procedure when performed manually with a single channel pipette. INTEGRA's electronic pipettes allow precise and efficient transfer of multiple samples in parallel, significantly speeding up the reformatting process. For example, the VOYAGER

adjustable tip spacing pipette is an ideal tool when the source and target plate formats differ, and can be used either manually or automated on the ASSIST PLUS pipetting robot. For even higher throughput reformatting, the VIAFLO 96, VIAFLO 384 and MINI 96 offer a fast solution for whole plate transfers.

If you want to know how to accelerate tube to plate transfers, this application note could also be of interest to you: [Fast and efficient tube to plate transfers](#)

Key benefits:

- Replicate or reformat of all kinds of plates – including 12, 24, 48, 96, 384 or 1536 well plates – quickly and easily.
- Transfer 384 samples at once to significantly accelerate pipetting productivity.
- Pipetting errors and transfer mistakes are eliminated using INTEGRA's electronic pipettes.
- Reproducibility and accuracy of liquid handling steps increased – the VIAFLO 96 handheld electronic pipette is four times faster than pipetting with an 8 channel electronic pipette. Sample transfers with the ASSIST PLUS pipetting robot are 12 times faster than using a single channel pipette.

Overview: How to transfer samples from plates to plates

The sections of this application note cover:

1. 96 well plate replication
2. Transfer from 96 well plates to 384 well plates
3. 384 well plate replication
4. Transfer from 384 well plates to 1536 well plates
5. Transfer from 24 well plates to 96 well plates
6. Processing of 48 well plates
7. 24 well plate replication
8. Processing of 12 well plates



ASSIST PLUS

This application note shows some examples of how to transfer samples from plate to plate (**Figure 1**).

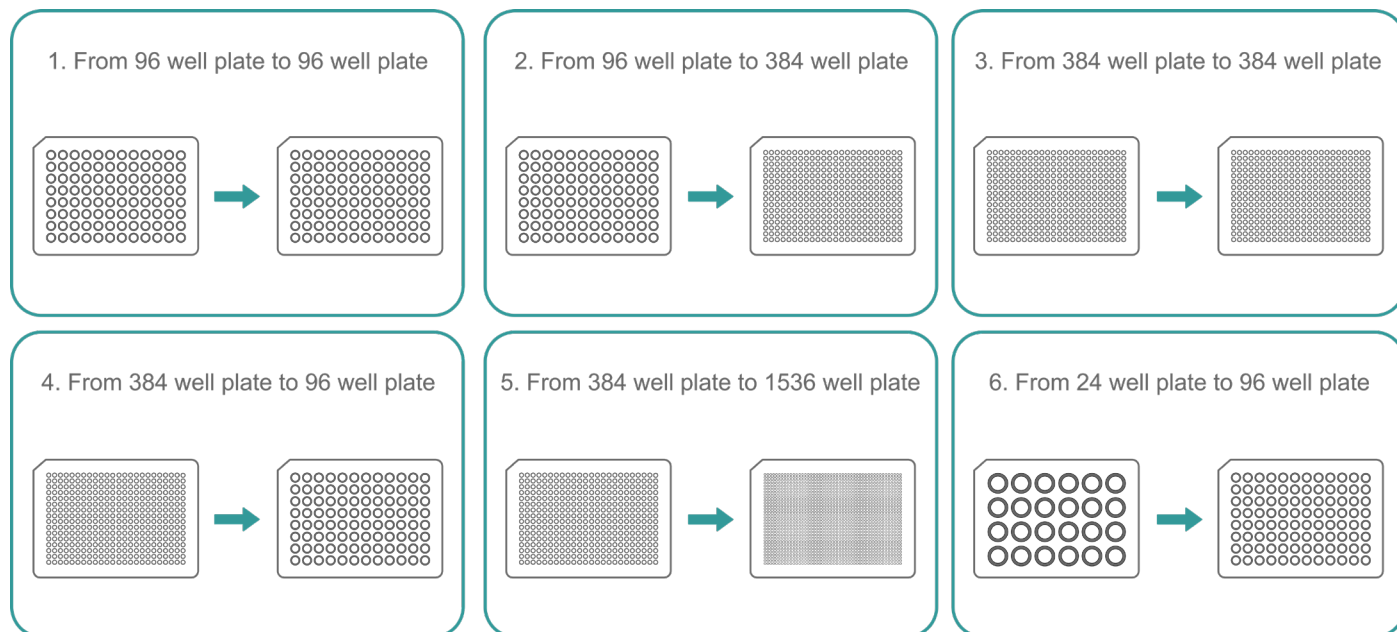


Figure 1: Most common plate to plate transfer procedures.

Table 1: Summary of possible plate to plate transfers with INTEGRA electronic pipettes.

	To						
	well plates	≤ 12	24	48	96	384	1536
From	≤ 12	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS		
	24	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS VIAFLO 96 VIAFLO 384	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS VIAFLO 96 VIAFLO 384	VOYAGER ASSIST PLUS	
	48	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS	
	96	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS VIAFLO 96 VIAFLO 384	VOYAGER ASSIST PLUS	VIAFLO VOYAGER ASSIST PLUS MINI 96 VIAFLO 96 VIAFLO 384	VOYAGER ASSIST PLUS (MINI 96) VIAFLO 96 VIAFLO 384	
	384	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS	VOYAGER ASSIST PLUS (MINI 96) VIAFLO 96 VIAFLO 384	VIAFLO VOYAGER ASSIST PLUS (MINI 96) VIAFLO 96 VIAFLO 384	(ASSIST PLUS) VIAFLO 384

1. 96 well plate replication

STEP: Transferring samples from one 96 well plate to another 96 well plate.

HOW TO: It is possible to replicate 96 well plates with all INTEGRA's electronic pipettes.

The MINI 96 portable electronic pipette, the VIAFLO 96 or VIAFLO 384 handheld electronic pipettes offer the easiest and fastest solution to replicate a 96 well plate. These instruments transfer 96 samples in one pipetting step.

The 12 channel VOYAGER and the VIAFLO electronic pipettes can be used – either manually or on the ASSIST PLUS pipetting robot – to transfer samples from a 96 well plate to a 96 well plate.

Working manually with the VOYAGER adjustable tip spacing pipette is important to set the right well to well distance:

- 26 mm for 12 well plates
- 19 mm for 24 well plates
- 14 mm for 48 well plates
- 9 mm for 96 well plates
- 4.5 mm for 384 well plates.

This can be done by selecting 'Tip spacing' in the main menu of the pipette, followed by choosing 'Position 2', and setting the tip spacing accordingly. Once saved, the tip spacing is available at any time.

Pairing the VIAFLO or VOYAGER electronic pipettes with the ASSIST PLUS pipetting robot allows a hands-free replication process.

2. Transfer from 96 well plates to 384 well plate

STEP: Transferring samples from 96 well plates to a 384 well plate.

HOW TO: It is possible to transfer samples from 96 well plates to a 384 well plate with all INTEGRA's electronic pipettes. For example, the VOYAGER 8 and 12 channel electronic pipettes can be used, or they can be paired with the ASSIST PLUS pipetting robot.

When deciding which instrument to choose for sample transfer from four 96 well plates to a single 384 well plate, the sample order in the destination plate should be considered (see **Figure 2**). The sample order from the source plates can easily be maintained when transferring the samples with a VOYAGER (with or without the ASSIST PLUS), but using the VIAFLO 96 or the MINI 96 will change the sample order.

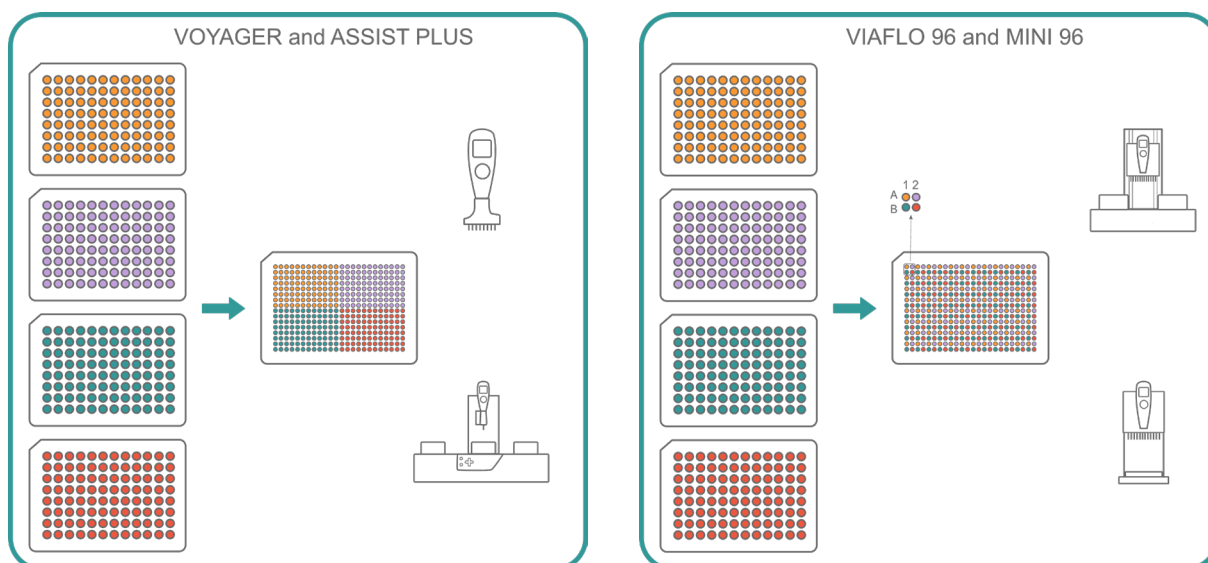


Figure 2: Sample transfer from four 96 well plates to one 384 well plate with the VOYAGER, ASSIST PLUS, VIAFLO 96 and MINI 96.

3. 384 well plate replication

STEP: Transferring samples from one 384 well plate to another 384 well plate.

HOW TO: Replication of 384 well plates is possible with all INTEGRA's electronic pipettes.

The fastest option is the VIAFLO 384 handheld electronic pipette, which allows the transfer of 384 samples in one go. Alternatively, the VIAFLO 96 handheld electronic pipette enables sample transfer in four steps.

On the ASSIST PLUS pipetting robot, the 12 channel VOYAGER or 16 channel VIAFLO electronic pipettes are the fastest options. The 384 well plates should be placed in a portrait orientation on the deck when using the 12 channel VOYAGER, or in a landscape orientation when using the 16 channel VIAFLO (**Figure 3**).

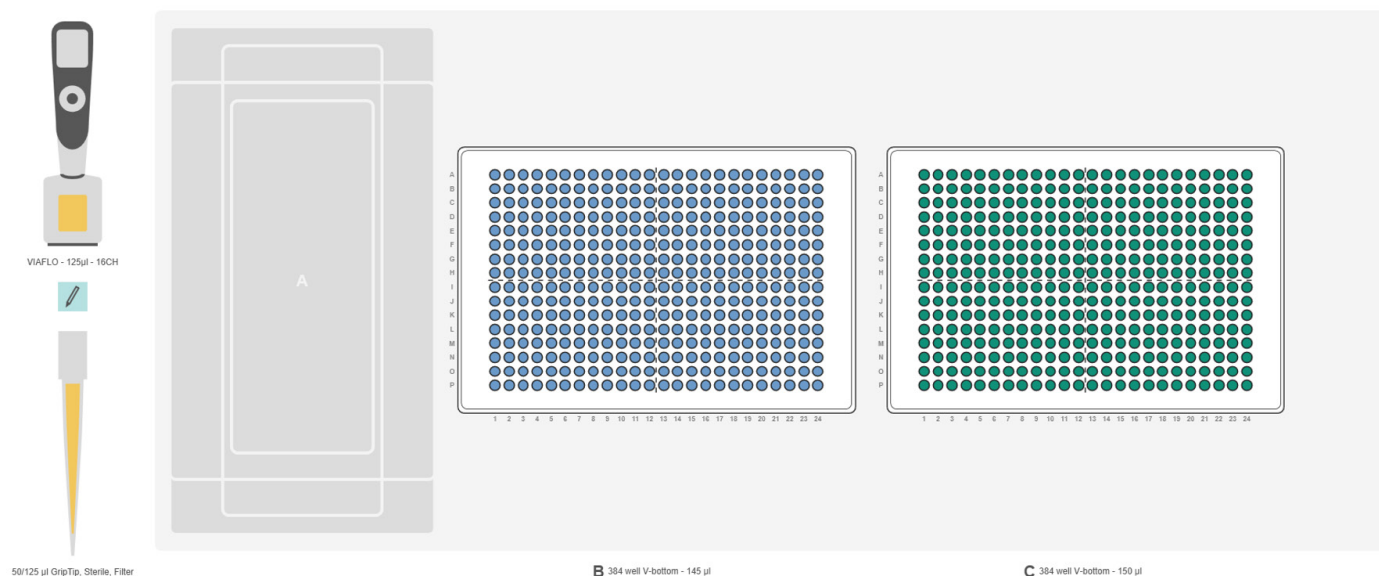


Figure 3: 384 well plate replication with the ASSIST PLUS pipetting robot and 16 channel VIAFLO electronic pipette.

4. Transfer from 384 well plates to 1536 well plates

STEP: Transferring samples from 384 well plates to a 1536 well plate.

HOW TO: The VIAFLO 384 is the ideal instrument to transfer samples from 384 well plates to a 1536 well plate. However, the resulting sample order in the destination plate should be taken into account (see **Figure 4** and **Figure 5**).

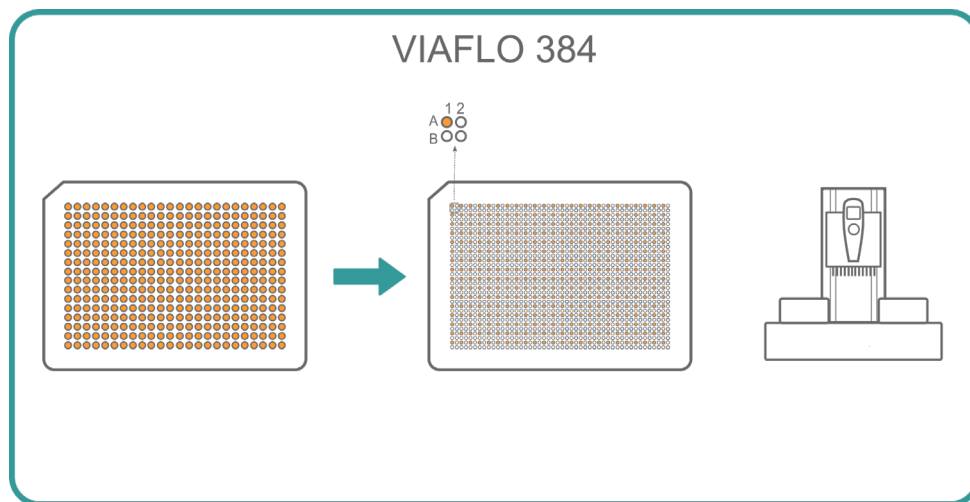


Figure 4: Sample transfer from a 384 well plate to a 1536 well plate with the VIAFLO 384.

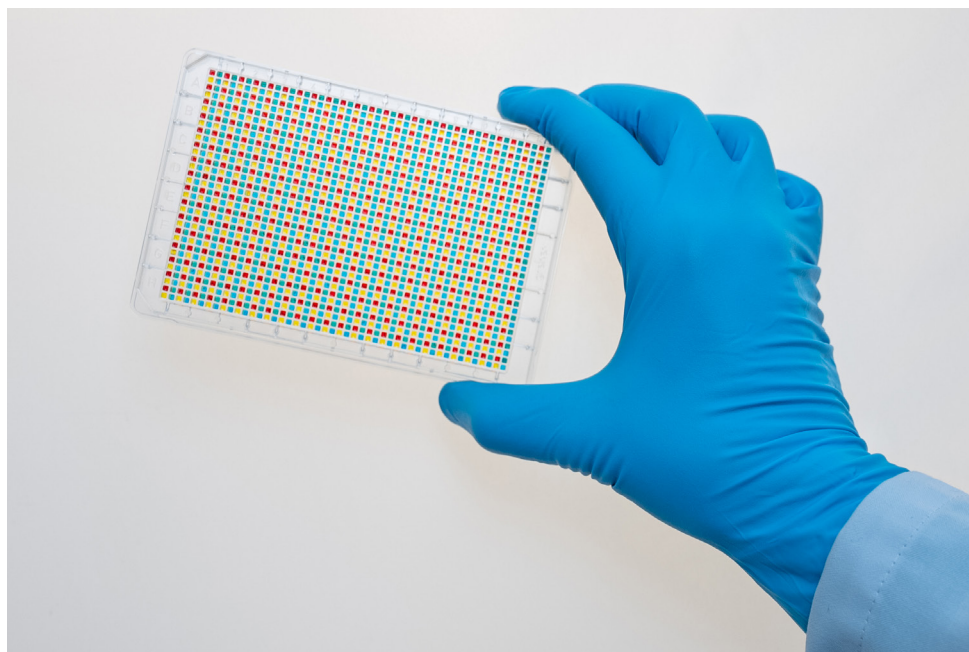


Figure 5: Result of pipetting samples from four 384 well plates to a 1536 well plate with the VIAFLO 384.

5. Transfer from 24 well plates to 96 well plate

STEP: Transferring samples from 24 well plates to a 96 well plate.

HOW TO: Transferring samples from 24 well plates to a 96 well plate can be performed manually with the VOYAGER adjustable tip spacing pipette or can be automated by pairing the VOYAGER with the ASSIST PLUS pipetting robot. Alternatively, the VIAFLO 96 and VIAFLO 384 handheld electronic pipettes can be equipped with a 24 channel pipetting head.

The VOYAGER 6 channel electronic pipettes can be used to transfer samples from a 24 well plate to a 96 well plate and, when using the ASSIST PLUS, the right plate orientation is very important. The 24 and the 96 well plates should be placed in portrait orientation on the deck (**Figure 6**).

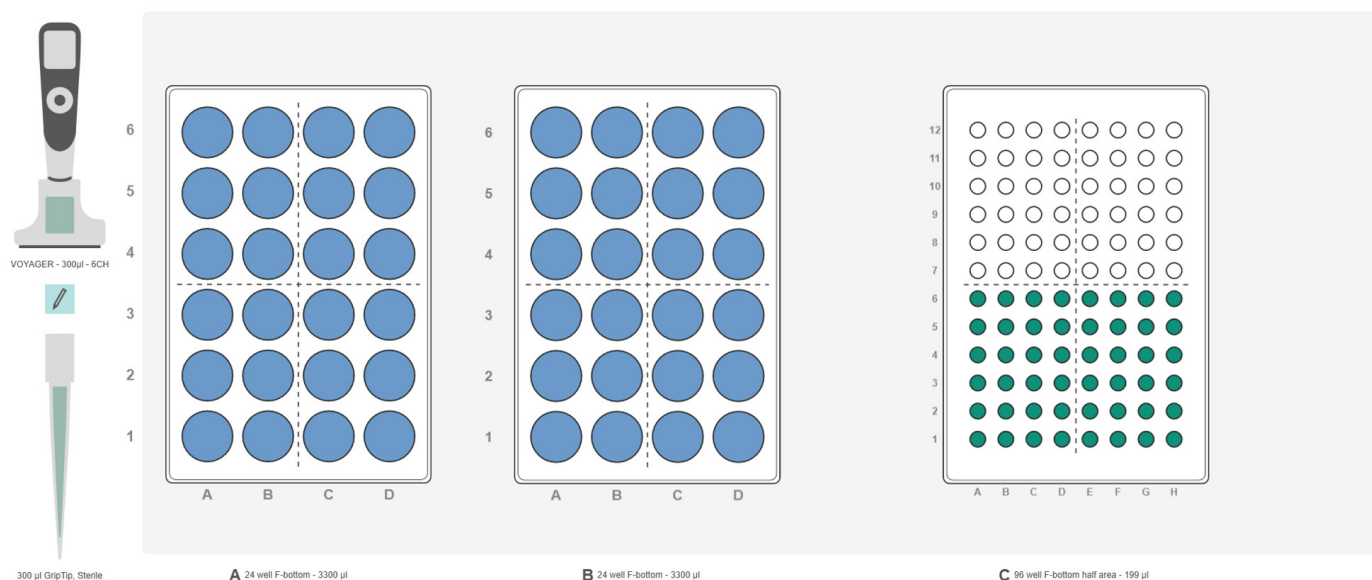


Figure 6: Sample transfer from two 24 well source plates (blue wells) to a 96 well destination plate (green wells) with the ASSIST PLUS pipetting robot.

When a VIAFLO 96 or VIAFLO 384 with a 24 channel pipetting head is used to transfer samples from 24 well plates to a 96 well plate, the user should be aware of the sample order in the destination plate (see **Figure 7**).

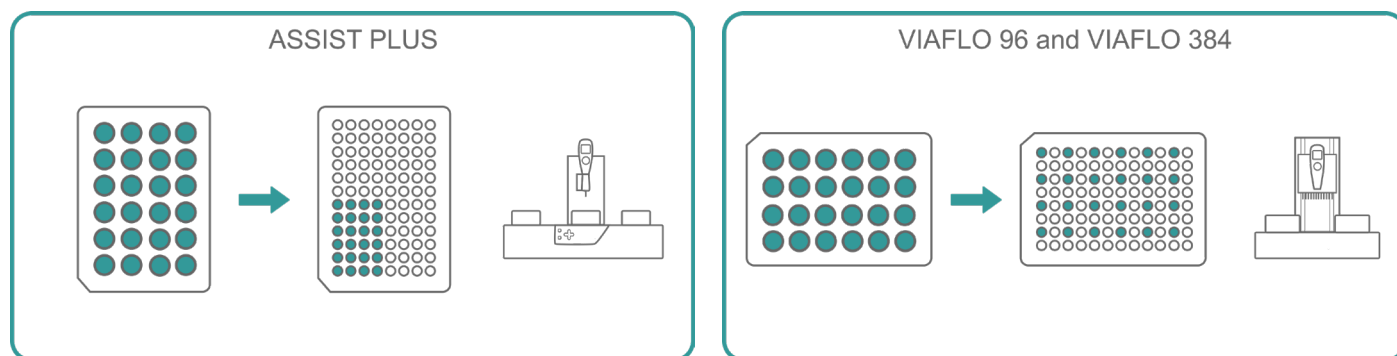


Figure 7: Sample transfer from a 24 well plate to a 96 well plate with either the ASSIST PLUS pipetting robot or the VIAFLO 96 and VIAFLO 384 handheld electronic pipettes.

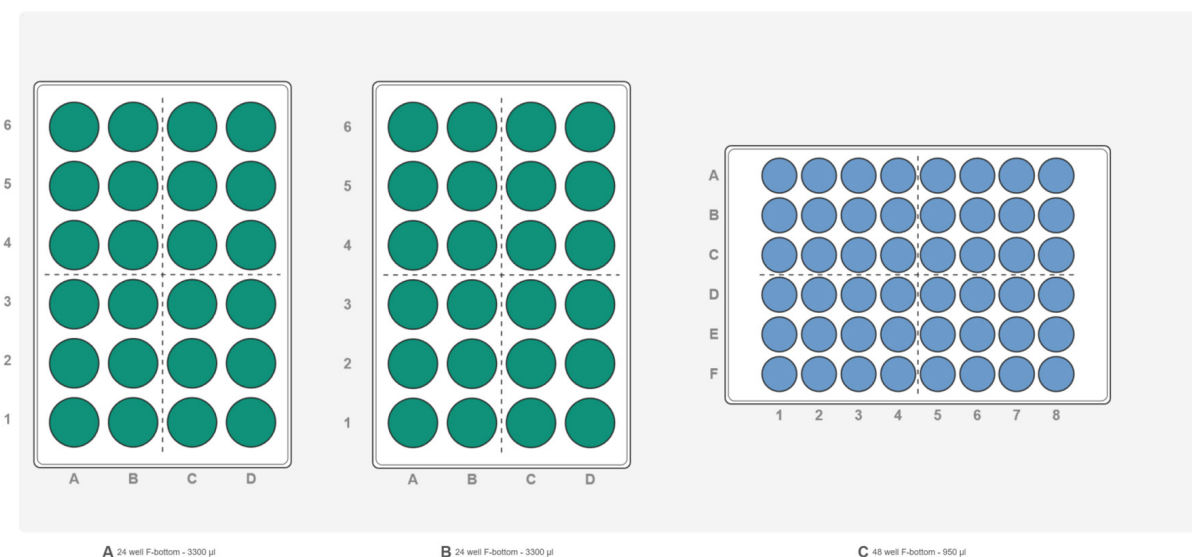
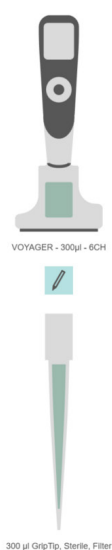
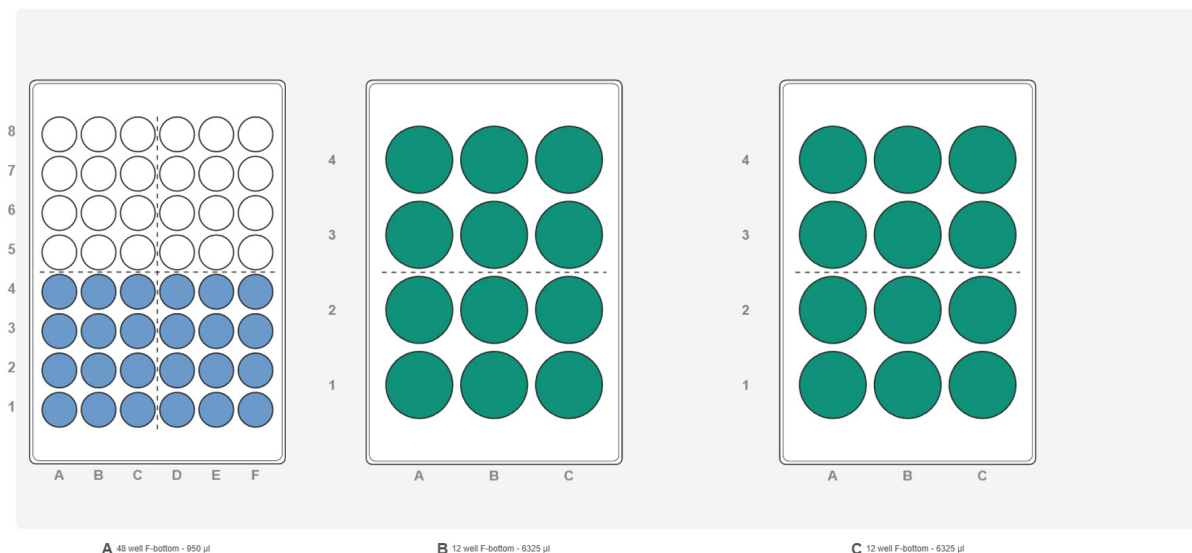
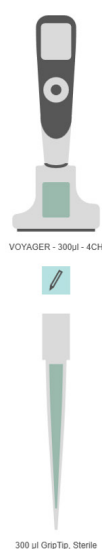
6. Processing 48 well plates

STEP: Transferring samples from 48 well plates.

HOW TO: Transferring samples from 48 well plates to 12, 24, 48, 96 or 384 well plates can be performed manually with a VOYAGER adjustable tip spacing pipette, or automatically by using the VOYAGER in combination with an ASSIST PLUS pipetting robot.

Depending on the target plate, 4, 6 or 8 channel VOYAGER pipettes can be used to transfer samples from 48 well plates.

When the ASSIST PLUS pipetting robot is used for transfers from a 48 well plate to 12 well plates, both plates should be in portrait format. For transfers from a 48 well plate to 24 well plates, the 48 well plate should be in landscape orientation, while the 24 well plate should be in portrait. When a 48 well plate is replicated, both plates should be in portrait orientation. For transfers from a 48 well plate to a 96 or 384 well plate, the 48 well plate has to be in portrait orientation, and the 96 or 384 well plate in landscape (**Figure 8**).



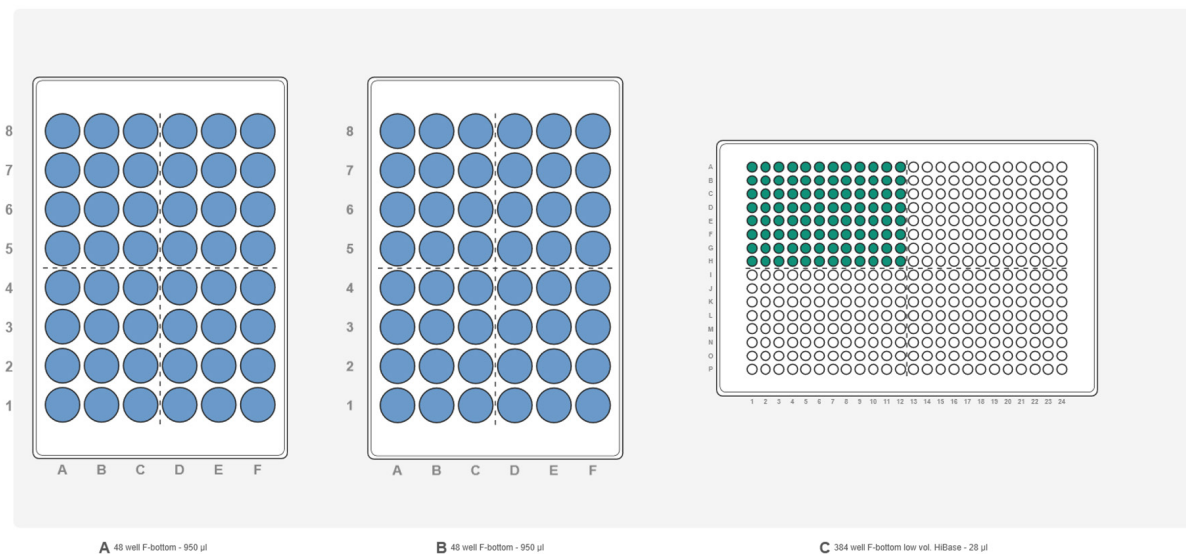
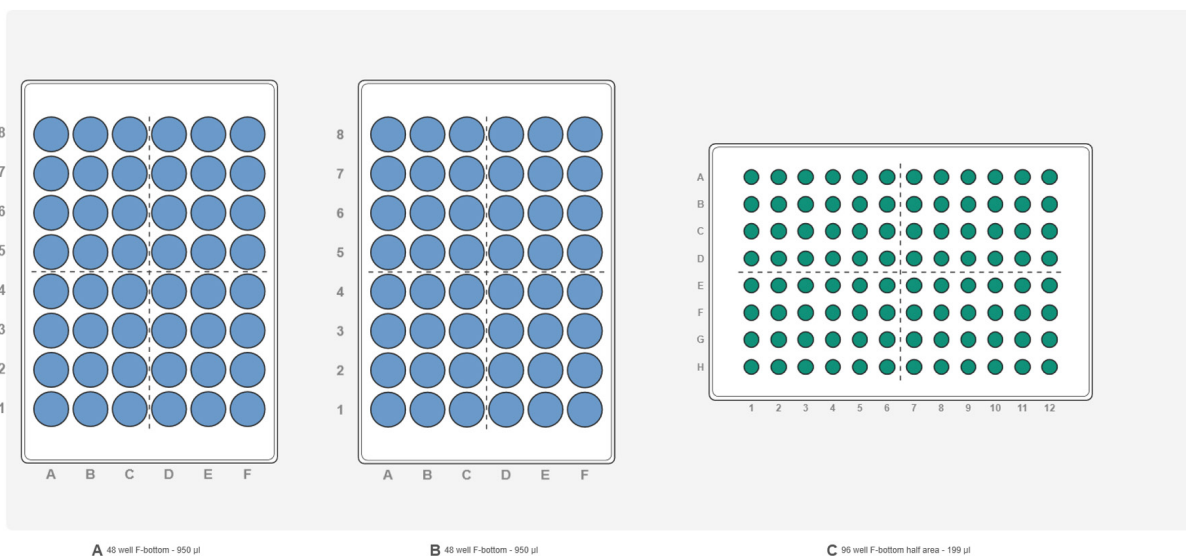
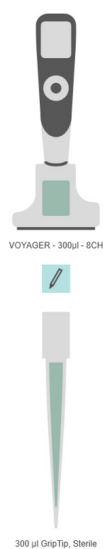
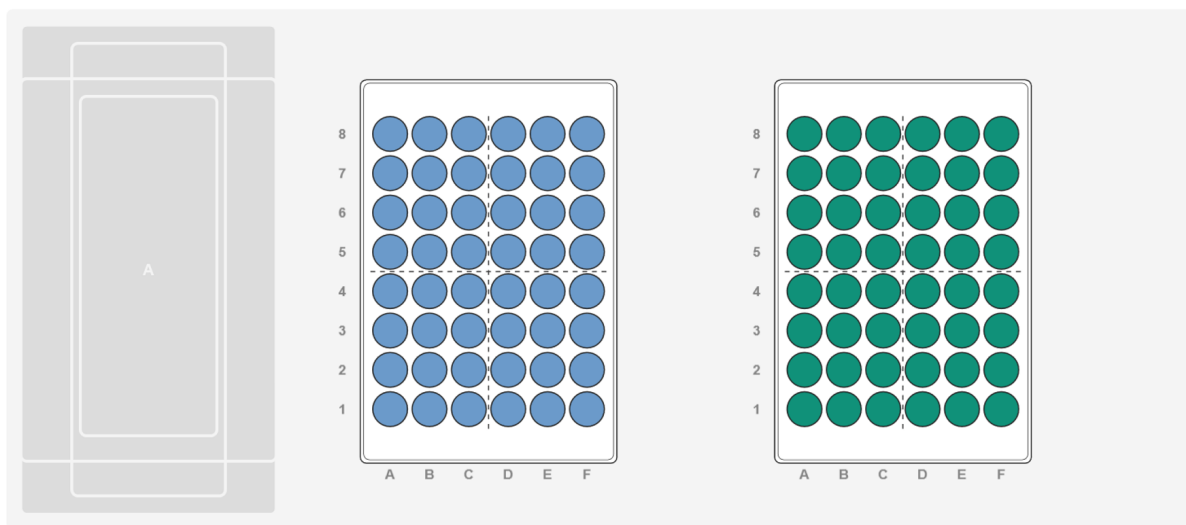
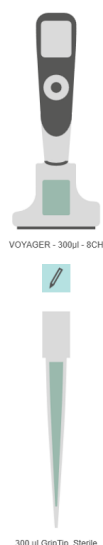


Figure 8: Sample transfers from 48 well source plates (blue) to various destination plates (green) with the ASSIST PLUS pipetting robot.

7. 24 well plate replication

STEP: Transferring samples from one 24 well plate to another 24 well plate.

HOW TO: Replicating a 24 well plate is possible with the VOYAGER adjustable tip spacing pipettes, an ASSIST PLUS pipetting robot paired with a VOYAGER pipette, or with the VIAFLO 96 and VIAFLO 384 handheld electronic pipettes equipped with a 24 channel pipetting head.

A 4 or 6 channel VOYAGER pipette can be used for the transfer. When the sample transfer is automated with the ASSIST PLUS pipetting robot, the plates have to be in landscape orientation if a 4 channel VOYAGER pipette is used, whereas a 6 channel VOYAGER pipette requires plates to be placed in portrait.

For processing of a full 24 well plate in one go, the VIAFLO 96 and VIAFLO 384 handheld electronic pipettes can be used with a 24 channel pipetting head (**Figure 9**) and 24 channel plate holders. With this set-up, it is possible to load GripTips from a tip box four times. Always check the well to well distance of the 24 well plate, and align the pipetting head according to your plate.



Figure 9: Sample transfer between 24 well plates with the VIAFLO 96 handheld electronic pipette equipped with a 24 channel pipetting head.

8. Processing of 12 well plates

STEP: Transferring samples from 12 well plates.

HOW TO: Transferring samples manually from 12 well plates to 12, 24, 48 or 96 well plates is possible with a VOYAGER adjustable tip spacing pipette, or automatically with the ASSIST PLUS pipetting robot equipped with a VOYAGER pipette.

For transferring samples from a 12 well plate to any other plate format, a 4 channel VOYAGER electronic pipette is required (**Figure 10**).



Figure 10: Sample transfer from a 12 well plate to a 24 well plate with a 4 channel VOYAGER 1250 µl adjustable tip spacing pipette.

When using the ASSIST PLUS pipetting robot, the 12 well plate has to be placed on the deck in portrait orientation (**Figure 11**). 12 well plate to 24 or 96 well plate transfers require the destination plate to be in landscape orientation, whereas 12 well plate to 48 well plate transfers require the 48 well plate to be in portrait. Two 12 well plates can be processed without any manual intervention, giving more walk-away time.

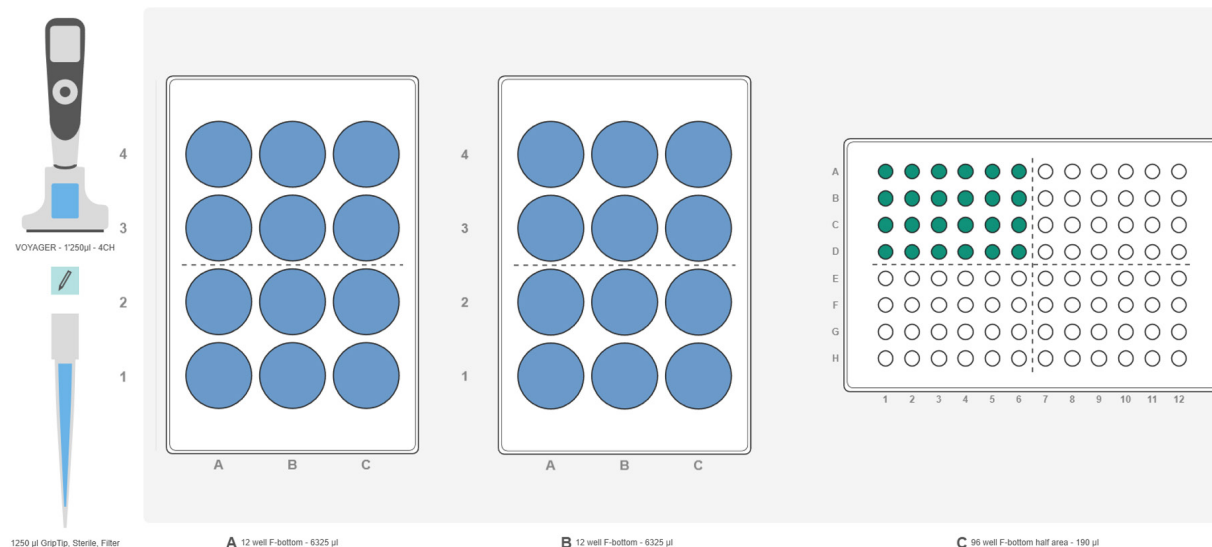
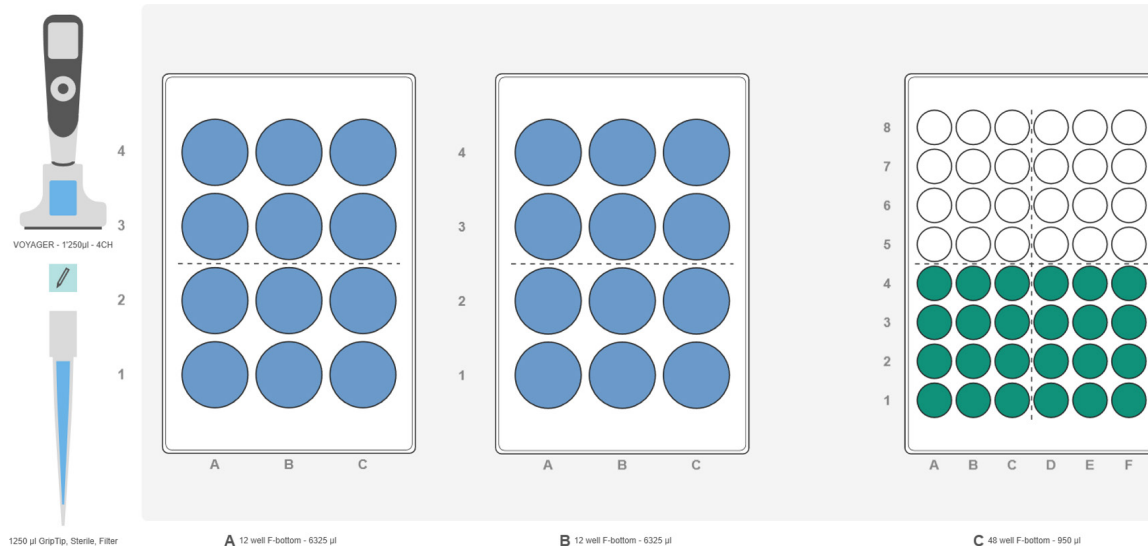
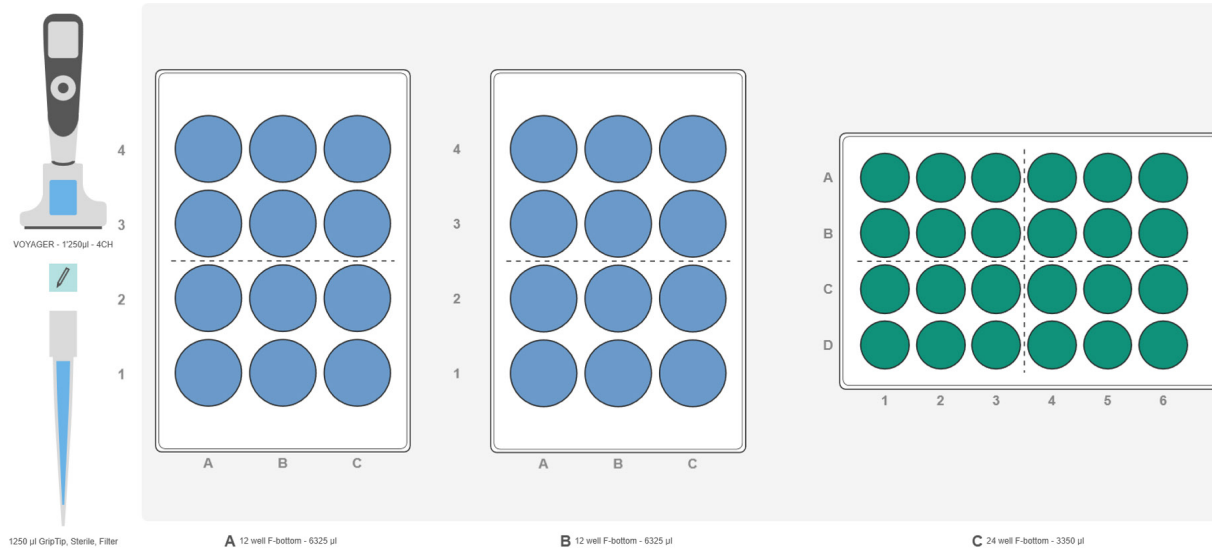


Figure 11: Sample transfer from a 12 well source plate (blue) to various destination plates (green) with the ASSIST PLUS pipetting robot.

Conclusion

- Sample transfers from plate to plate, even between different formats, is no longer a cumbersome task using INTEGRA's VOYAGER, ASSIST PLUS, MINI 96, VIAFLO 96 or VIAFLO 384.
 - Reformatting has never been easier, quicker and more reproducible.
 - Sample transfers from and to all possible plate types is achievable. The VOYAGER adjustable tip spacing pipette is available with various numbers of channels, and in different volumes. The VIAFLO 384 handheld electronic pipette can be equipped with 24, 96 or 384 channel pipetting heads with different pipetting volumes, the
- VIAFLO 96 can be used with 24 and 96 channel pipetting heads, and the MINI 96 portable electronic pipette is available in four volume ranges.
- Thanks to the compact footprint of the instruments, they can be placed in a laminar flow hood when sterile working conditions are required.
 - If high throughput and fast pipetting is needed, the MINI 96, VIAFLO 96 and VIAFLO 384 are the best solutions. Alternatively, an ASSIST PLUS equipped with a VOYAGER pipette provides the most versatile, fully automated set-up for plate to plate reformatting.

Materials

Manufacturer	Part Number	Description	Link
INTEGRA Biosciences	4505	ASSIST PLUS base unit	https://www.integra-biosciences.com/global/en/pipetting-robots/assist-plus
INTEGRA Biosciences	6001	VIAFLO 96 base unit	https://www.integra-biosciences.com/global/en/electronic-pipettes/viaflo-96-viaflo-384
INTEGRA Biosciences	6031	VIAFLO 384 base unit	https://www.integra-biosciences.com/global/en/electronic-pipettes/viaflo-96-viaflo-384
INTEGRA Biosciences	6123 6124	24 Channel Pipetting Heads	https://www.integra-biosciences.com/global/en/electronic-pipettes/viaflo-96-viaflo-384
INTEGRA Biosciences	6101 6106 6102 6103 6104	96 Channel Pipetting Heads	https://www.integra-biosciences.com/global/en/electronic-pipettes/viaflo-96-viaflo-384
INTEGRA Biosciences	6131 6136 6132	384 Channel Pipetting Heads	https://www.integra-biosciences.com/global/en/electronic-pipettes/viaflo-96-viaflo-384
INTEGRA Biosciences	4801 4802 4803 4804	MINI 96 Pipettes	https://www.integra-biosciences.com/global/en/electronic-pipettes/mini96
INTEGRA Biosciences	4641 4646 4642	VIAFLO 16 Channel Electronic Pipettes	https://www.integra-biosciences.com/global/en/electronic-pipettes/viaflo
INTEGRA Biosciences	4743 4744	VOYAGER 4 Channel Electronic Pipettes	https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager
INTEGRA Biosciences	4766 4764	VOYAGER 6 Channel Electronic Pipettes	https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager

INTEGRA Biosciences	4721 4726 4722 4723 4724	VOYAGER 8 Channel Electronic Pipettes	https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager
INTEGRA Biosciences	4731 4736 4732	VOYAGER 12 Channel Electronic Pipette	https://www.integra-biosciences.com/global/en/electronic-pipettes/voyager
TPP Techno Plastic Products AG	92012	12 well PS Tissue Culture Test Plate	https://www.tpp.ch/page/produkte/09_zellkultur_testplatte.php
Greiner Bio-One International	662102	Multiwell plate for suspension culture, 24 well, PS	https://shop.gbo.com/en/switzerland/products/bioscience/cell-culture-products/cellstar-cell-culture-multiwell-plates/662102.html
Greiner Bio-One International	677102	Multiwell plate for suspension culture, 48 well, PS	https://shop.gbo.com/en/switzerland/products/bioscience/cell-culture-products/cellstar-cell-culture-multiwell-plates/677102.html
Greiner Bio-One International	652270	Sapphire microplate, 96 well, PP	https://shop.gbo.com/en/switzerland/products/bioscience/molecular-biology/pcr-microplates/652270.html
Greiner Bio-One International	781101	Microplate, 384 well, PS, F-bottom	https://shop.gbo.com/en/switzerland/products/bioscience/microplates/384-well-microplates/384-well-polystyrene-microplates-clear/781101.html
Greiner Bio-One International	782061	Microplate, 1536 well, PS, F-bottom	https://shop.gbo.com/en/switzerland/products/bioscience/microplates/1536-well-microplates/1536-well-hibase-microplates/782061.html

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