Technical Bulletin

Tecan Columbus Washer FAQ

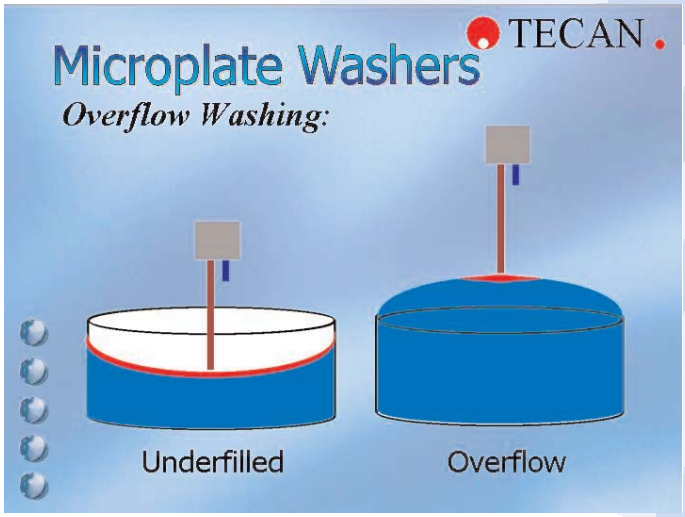
About the Tecan Columbus Washer

The Tecan Columbus plate washer is an automated and flexible microplate strip washer. Users have a choice of using an 8, 12, or 16 channel manifold. The system is non-pressurized, so any bottle may be used to hold the wash reagents. There are several unique features to increase washing efficiency, such as Overflow Washing and Crosswise Aspiration. And like all of Tecan's instruments, it is completely robotics compatible for HTS applications.

What is Overflow Washing?

Overflow washing results in the most complete removal of unwanted reagents from a microplate well. Washers that simply add wash buffer to a well and then aspirate it out often miss a thin film of reagent that "floats" on the convex meniscus of the well (see the figure below, the "Underfilled" well on the left) and is left behind as a "bathtub ring".

However, the Columbus can perform a unique Overflow Washing function where the well is completely filled. The liquid will never spill out of the well, because the instrument is actually aspirating and dispensing at the same time. With the well slightly overfilled, the unwanted reagent floats to the center of the convex meniscus and is aspirated off (see the figure below, the "Overflow" well on the right).



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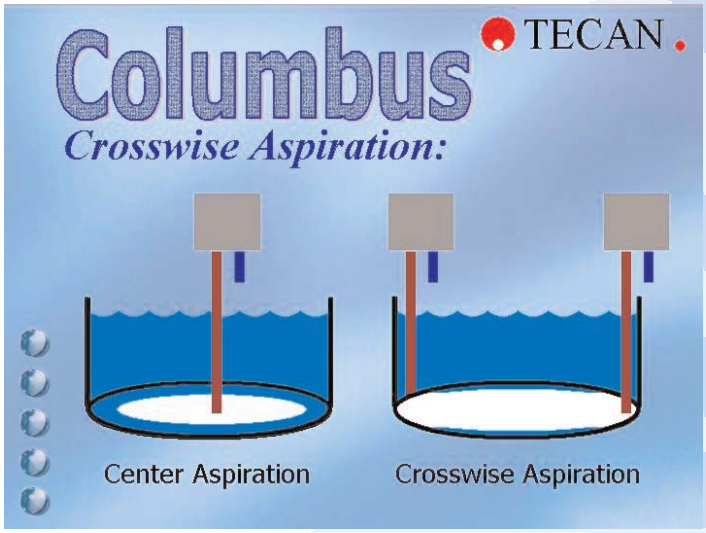
What is Crosswise Aspiration?

Aspiration in the center of a flat bottom well always results in a significant amount of liquid being left behind around the bottom edges of the well (see the figure below, the well on the left). The Columbus washer is capable of aspirating in an offset manner. In this way, the nozzles are aspirating from the sides of the well. This results in a greater amount of the liquid from the well being removed, and can increase the efficiency of the washing steps of an assay.



What are the different Rinse modes (soak, day, night, auto)?

To keep the Columbus washer working at its optimal performance level, it is necessary to rinse the instrument on a regular basis. This will prevent the salts and detergents common in assay buffers from clogging tubing and nozzles. There are four rinse options:

- Soak Rinse should be used when the instrument is going to sit for one-half hour or less. Distilled water or a wash solution can be used.
- Day Rinse should be used when the instrument is going to sit for longer than one-half hour, but not longer than half a day. This option can also be used to rinse the instrument if it has been unused for a long period of time. Either distilled water or a wash solution can be used.
- Night Rinse should be used at the end of the day, when the instrument will be stored overnight or for multiple days. Distilled water should be used for this rinse process.
- Auto Rinse is the same rinse procedure as the Day Rinse, but it is programmed to repeat itself at set time intervals (from 1 to 24 hours).

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Can I add liquid sensing or Fill Verification to my existing washer?

No. The manifolds required for these options must be installed by the factory.

Can I change manifolds?

Yes. It is possible to use an 8, 12, or 16 (2x8) channel manifolds on the Columbus washer. There are detailed instructions in Chapter 7 of the User's Manual.

What is the difference between Stripe Mode and Plate Mode washing?

In the Plate Mode, all of the steps of a program up to a Soak step are performed on one strip of the plate before proceeding to the next strip. This allows you to process an entire plate at one time, taking advance of Soak times to process the rest of the strips.

In the Strip Mode, the entire program is performed on one strip before proceeding to the next strip.

What washing parameter should I use for my ELISA test? What about cell washing?

For ELISA, you generally want to use a vigorous wash with a high aspiration speed and volume.

For cell washing, detachment of cells from the walls of the plate well is often a concern. You should us a gentle wash cycle; one with a low aspiration speed.

How can I optimize my plate washing?

Optimization of plate washing can take place in several key areas of the application:

- Soaking. This always increases the efficiency of wash applications. The Plate Mode can help increase soaking time because strips can be processed while other strips are soaking.
- Head height and speed optimization (aspiration and dispensation). Head heights and pipetting speeds are adjustable. Aspirating from the very bottom of the plate well and adjusting pipetting speed for reagent viscosity can help to increase wash efficiency.
- Overflow Wash (for ELISA). A more efficient way of removing unwanted reagents.
- Crosswise Aspiration (for ELISA). Removes nearly all of the liquid from the bottom of a flat-bottom well.
- Gentle Aspiration and Dispensation for Cell assays. Helps to avoid dislodging the cells from the walls of the microplate wells.
- Shaking. Increases the speed and efficiency of how the reagents work in the assay by thorough mixing.

How long will it take to wash my plate?

@ 500 microliters Overflow washing using Crosswise Aspiration:

		8-Channel	16-Channel
Plate Mode:	3 Cycles:	3:12	2:00
	5 Cycles:	4:40	2:53
	7 Cycles:		3:45
Strip Mode:	3 Cycles:	3:00	1:33
	5 Cycles:	3:20	2:10
	7 Cycles:		2:45

Can I use NaOH to clean my washer?

Cleaning your Columbus with NaOH is not recommended. This can lead to damage to the instrument which may affect the performance or make it completely unusable.

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