Smart Notes

Does the design of the membrane support plate affect filtration flow rates?

Yes. In a study designed to look at the flow rates of the Thermo Scientific™ Nalgene™ Rapid-Flow™ Sterile Single-use Filter Units, the column-based membrane support design of the Nalgene Rapid-Flow had up to 38% faster flow rates than competitors using a radial spoke membrane support design.

Background

Nalgene Rapid-Flow Sterile Single-use Filter Units have a unique column-based membrane support plate designed to hold the membrane in place during filtration (Figure 1). The evenly spaced columns allow the membrane to be uniformly supported when vacuum is applied and therefore creates a larger effective surface area. The larger effective surface area allows a more consistent and faster average flow rate when compared to other designs, including radial spoke, where membrane distortion occurs under vacuum pressure (Figure 2). A study was performed to compare flow rates between the Nalgene Rapid-Flow column support plate and the radial spoke design used in competitive vacuum filter units.

Nalgene Rapid-Flow Filter Units

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How were the filtration units tested?

Nalgene Rapid-Flow Sterile Single-use Filter Units with PES membrane (Cat. No. 567-0020) were filled with 1000 mL of Gibco™ BenchStable™ DMEM Basal Media (Cat. No. A4192102) containing 10% Fetal Bovine Serum (Cat. No. A3160402) and 1% Penicillin/Streptomycin antibiotic mix (Cat. No. 15140122). Vacuum pressure (at 25 in Hg) was applied to the filter units (in triplicate) and the flow rate (mL/min) was recorded using a calibrated receiver bottle and a timer. The average of the triplicate flow rates were reported. The competitive units were subjected to the same conditions using the same media for comparison.

What do the results show?

The average flow rate of the Nalgene Rapid-Flow Sterile Single-use Filter Units with PES membrane was 842.3 mL/min and that of the competitors was 520.0 mL/min (Figure 3). The Nalgene Rapid-Flow Filter Unit was 38% faster in flow rate compared to competitve units, leading to an overall decrease in the total amount of time it takes to filter a sample. It is important to note that filtration rates can vary depending on the vacuum pressure applied and sample filtered. Please test conditions prior to use.

Summary

- The Nalgene Rapid-Flow Sterile Single-use Filter Units have 38% faster flow rates compared to competitive filter units.
- The column-based membrane support plate used in Nalgene Rapid-Flow Sterile Single-use Filter Units has superior performance compared to the radial spoke design used in competitive filter units.
- The design of the membrane support plate can have an effect on the performance of a filtration device and should be taken into consideration when choosing a filtration device.

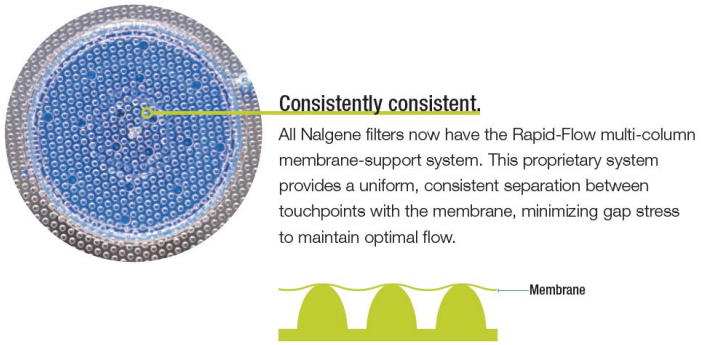

Figure 1. Nalgene Rapid Flow Sterile Single-use Filter Units have a column based membrane-support plate.

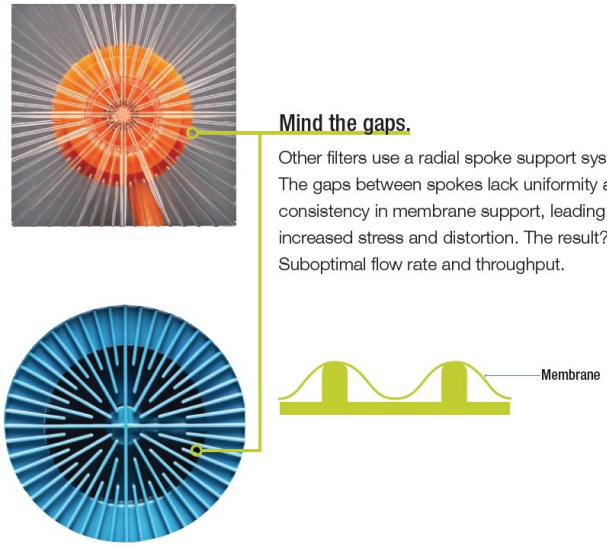

Figure 2. Competitive filter units utilize a radial spoke design plate.

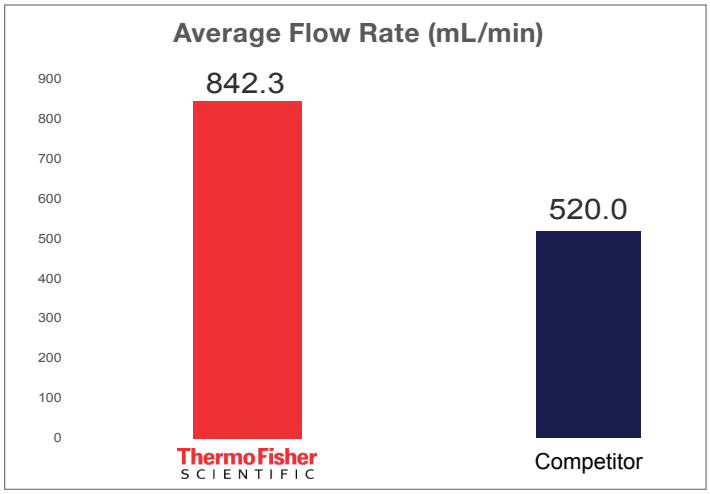

Figure 3. Nalgene Rapid-Flow™ Sterile Single-use Filter Units have up to 38% faster flow rate than competitive units.

Find out more at **thermofisher.com/rapidflow**

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