

Whatman Klari-Flex™

Background

Bottle Top Filter assemblies are designed for vacuum filtration of liquid, these units are ideal for biological and pharmaceutical sterilization requirements. Complete units come with a bottle-top filter and a receiver. The standard PES universal tissue culture membrane is inherently hydrophilic and exhibits low protein binding and fast flow. The 0.2 μm membrane pore size is used for sterilization of aqueous solutions and culture media while the 0.45 μm size is currently available on the market have side arms fitted with tubing adapters and graduated upper chambers hold from 115 to 1000 mL. Major competitors are Corning, Millipore and Nalgene.

The proposed Whatman prototype, figure 1, has an innovative drop-connect design that allows for the elimination of the need to connect and disconnect the assembly to the vacuum line, thus speeding up the process. Addition of the Bottle Top Filter Assemblies would widen and complete the Whatman laboratory product line.



Fig 1. Whatman Klari-Flex Bottle Top Filtration Unit



Equipment

- Pump: Millipore Model XX5500000 Ser. No. 0888
- Gauge: Cal ID#s 2778 and 2534
- Timers: Cal ID#s 2430, 2780, 2781, 2782
- Rocker: Thermolyne Speci-Mix Rocker (CNR0142)
- Calibrated micropipettes (1000 ul, 200 ul, 20 ul, 10 ul)
- Balance: Mettler Toledo AG 135 (Cal ID#1907)
- Fluorometer: Hitachi F-2000 (Cal ID# 2022)
- Vortex: Fisherbrand Vortex Genie 2 (CNR0133 and CNR0096)

Vacuum-driven Dynamic Liquid Throughput

Vacuum-driven dynamic liquid throughput was measured at -15+/-2 in. of Hg using 10% FBS supplemented DMEM solution and directly compared with the performance of commercially available analogs.

The following 0.2-0.22 micron 0.5 L vacuum systems were tested:

Brand Number	Whatman 10422/05	Nalgene 569-0020	Millipore SCGP U05 RE	Corning 431097
Pore size (microns)	0.22	0.2	0.22	0.22
Volume (ml)	500	500	500	500

Fig 2. Details of the evaluation materials.

Throughput (ml)	Whatman Time (sec)	Nalgene Time (sec)	Millipore Time (sec)	Corning Time (sec)
0	0	0	0	0
50	4.2	5.4	6.2	7.6
100	7	9	11.8	14.6
150	9.8	12.6	17.2	20.6
200	12.4	16.2	23	28
250	15.2	19.4	28.4	34.2
300	18	23.2	34.4	41.2
350	21	26.2	39.6	48.6
400	24	29.8	45.8	55.2
450	26.8	33.2	51.8	60.6
500	31	37.8	57.8	71

Fig 3. The results in seconds, of the time taken for the vacuum driven liquid to flow through the items listed in figure 2.

Results

Figure 4 below, indicates that the Whatman prototype system outperformed commercially available units in filtration speed of 10% FBS supplemented DMEM solution (data represent the average of 5 units of each kind tested with the same batch of solution). The difference is especially obvious in case of Millipore and Corning units due to their smaller filter size.

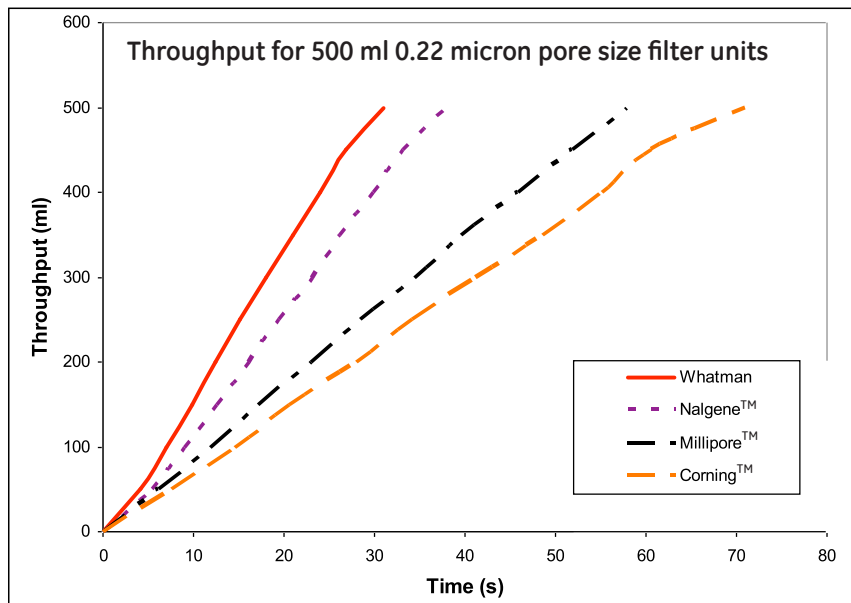


Fig 4. Vacuum-driven dynamic liquid throughput of 10% FBS supplemented DMEM solution filtered at -15 ± 2 in. of Hg via 0.5 L 0.2-0.22 micron vacuum filtration assemblies manufactured by Whatman, Nalgene, Millipore and Corning. Data represent the average of 5 units of each kind tested with the same batch of solution.

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