



VmaxTM Filtration System Optimization

Vmax Testing — a rapid and reliable tool for optimizing filtration system design

Vmax Testing — Rapid, Reliable

Vmax testing is a proven experimental method for designing and optimizing filtration systems used in the production of pharmaceutical fluids.

The Vmax test requires only a small volume of process fluid and can be performed in a matter of minutes, enabling rapid and cost-effective scale-up. Millipore Validation Specialists are trained to provide this service.

The speed, reliability, and versatility of Vmax testing allows entire filtration trains—from the first prefilter in the train to the final filter—to be designed within a short time frame. The savings in operating costs and the improvement in filter performance can be dramatic.

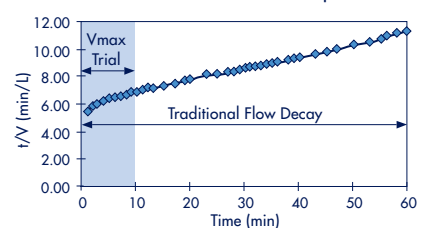
Description

Filter optimization data has traditionally been obtained by flow decay experiments. This conventional method may take several hours and consume considerable volumes of process fluid as

each filter is run until the flow rate has dropped to 20% of its initial value.

In contrast, Vmax testing, based on the gradual pore blocking model typically found in biological fluids, accurately predicts filter throughput in about ten minutes—conserving valuable process fluid and testing time. The figure below demonstrates the short time required to collect data for Vmax testing in contrast to traditional tests.

Vmax Test Results for Bedford Tap Water



During Vmax testing, the cumulative volume is recorded as a function of time and then a Vmax value—the maximum volume that will pass through the filter—is calculated.

The procedure requires a small filter device, a limited amount of process fluid, and only a short filtration time to acquire meaningful results. Filters of various media compositions and pore size ratings can be effectively evaluated with a wide range of process fluids.

Cost-effective Scale-up

Vmax data obtained from a small disk filter can be used to determine the performance of full-size process scale filters. When scale-up factors are large,

- ▶ Minimize filtration costs by identifying optimum filtration system design
- ▶ Use a simple, proven mathematical model to predict scaled-up filter flow rate and throughput performance
- ▶ Allow easy, inexpensive performance comparisons of filtration train designs
- ▶ Reduce process fluid waste and system development time

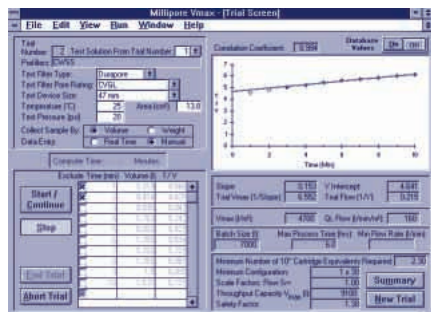


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a pilot trial should be conducted with an intermediate-scale filtration train under actual process conditions. A final full-scale system can then be designed.

Reliable Results

Millipore has developed proprietary Vmax software to facilitate data collection and analysis during Vmax testing. This software enables our specialists to



assist Millipore customers in filter sizing based on a variety of filter configurations and process scenarios. Millipore filtration experts will prepare a comprehensive report of the Vmax test results, complete with recommendations for

the optimal filtration train for your pharmaceutical operation.

The Millipore Advantage

Millipore filtration specialists are dedicated to providing the pharmaceutical industry with superior products and services that increase the efficiency of filtration operations. Years of experience and research in filtration optimization have enabled Millipore to develop methods that save time and money, guarantee superb filter performance, and provide a business advantage.

How to Request the Filtration Optimization Service

A Millipore filtration expert can provide you with the technical expertise needed to conduct Vmax testing and process simulations. For assistance in optimizing your filtration system, call your Millipore Applications Specialist or the Millipore office closest to you.

For additional information, refer to "Vmax Testing for Practical Microfiltration Train Scale-Up in Biopharmaceutical Processing." Millipore reprint RP221.

To Receive More Information on Millipore's Access Services

For additional information call your nearest Millipore office:

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