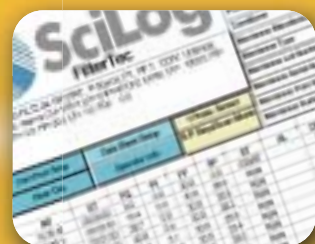


# FilterTec™

## Dead-End Filtration System

- *Filterability Studies and Vmax Determination*
- *Real-Time Data Collection of 15 Filtration Parameters and Graphs*
- *Serial or Parallel Filter Trains with 3 Pressure Sensor Hook-ups*
- *Increased DEF Filter Utilization up to 35%*
- *Safe, Walk-away System Operation*
- *Compatible with All Manufacturers' Filters!*

i n t e l l i g e n t b i o p r o c e s s i n g s y s t e m s



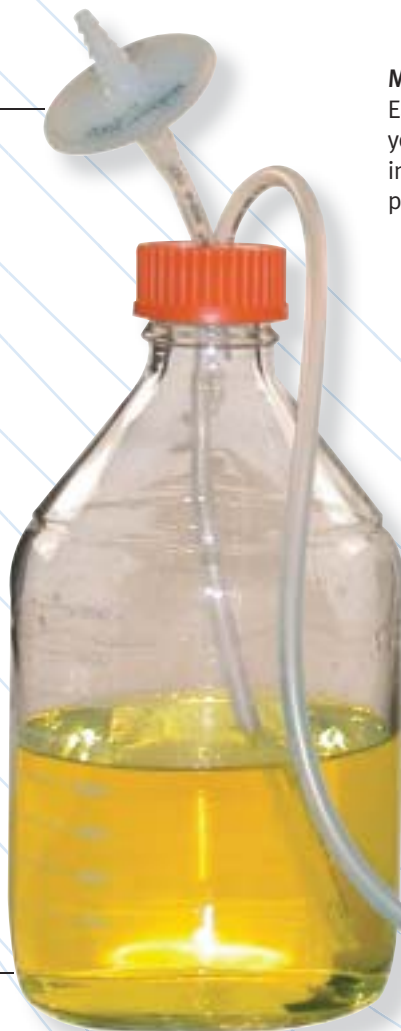
 **SciLog®**  
Intelligent Bioprocessing Systems

# FilterTec™

## Dead-End Filtration System

Patented technology\* includes on-board software and hardware system that automates, optimizes and documents Dead-End Filtration. Introducing the FilterTec™ Lab Dead End Filtration System, the newest addition to the patented line of SciLog® Intelligent BioProcessing Systems. The FilterTec™ System is an exclusive software-driven fluid delivery system that automatically adjusts feed rate and backpressure and documents 15 filtration parameters during your DEF. Ideal for DEF benchtop applications, including Filterability Studies, Vmax determination, and Filter-Train studies. Increases DEF filter utilization up to 35%. Instant overview of filtration progress to optimize filtration efficiency.

Sterilizing Air Filter



Processing volume

### Membrane Keyboard.

Easy control and automation of your procedure. Intuitive user interface and set-up. Six user-programmable alarms.

20 character,  
2-line back-lit LCD

Recessible handle



**Tandem Peristaltic Pump.** Maximum 45 psi. Mounted on optically encoded, servo-controlled motors. Choice of 3 different motors/flow ranges. Tandem 1081 uses tubing sizes #13, 14, 16, 17 and 25. Tandem 1082 uses tubing sizes #15, 24 and 35. Can piggy-back two(2) Tandem heads.

\* US Patents:  
5,947,689; 6,350,382; 6,607,669;  
other patents pending



**Disposable Pressure Sensor.** Maximum 60 psi, monitors and controls pressure. Up to 3 pressure sensors available for Filter-Train studies!

**Dead End Filter.** Compatible with Dead End filters by Pall, Millipore, Sartorius, Microgon, A/G, Asahi Kasei, etc.

It-in support to mount your filter vice.

Filtrate collected in vessel

Documentation to printer or Excel® file

Factory calibrated

**Reproducible Filtrate Yields.** FilterTec™ interfaces with an electronic balance for quantitative filtrate yield.

## Dead-End Filtration – Optimized

Optimized Dead-End Filtration (DEF) can be readily achieved with the FilterTec™ utilizing the SciLog® *R/P Stat Method*. This automated procedure maintains a user-defined pump rate (e.g. 100 ml/min) until a user-defined upper pressure limit (e.g. 20 psi) has been attained as a result of filter plugging. At this point the system automatically switches from a constant rate to a constant pressure fluid delivery (see Figure 1). The pump output is automatically regulated to maintain the desired pressure limit. With progressively increasing filter plugging, the pump output decays until a user-defined, low pump rate limit (e.g. 0.5 ml/min) has been attained, at which point the system will cease pumping.

In contrast to older DEF procedures, the new *R/P Stat Method* allows full utilization of the existing filter capacity and is accompanied by a significant increase in total filter throughput. In addition to a filtration yield increase of up to 35% (compared to constant pressure throughput data), the *R/P Stat Method* provides a safe, walk-away automation capability. User-selectable alarm conditions are continuously monitored, including High/Low Pressure Alarms, Low Flow Alarm and Filtrate Weight/Volume Alarms.

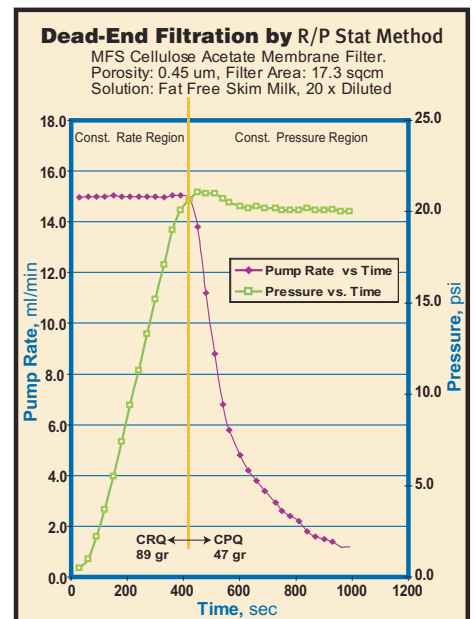


Figure 1

FilterTec™ applications

Filterability Studies – Made Easy

In addition to single-point pressure measurements, the FilterTec™ is capable of simultaneously monitoring up to three disposable pressure sensors. This capability is particularly useful in monitoring the pressure differentials of multiple filters in a serial or a parallel filter train. For a given process solution, excessive pressure build-up across a single filter element typically indicates the need for a larger porosity and/or larger area filter element. An optimally designed filter train will maximize the capacity, i.e. throughput, of the filter train.

The FilterTec™ contains application tools for developing and optimizing DEF filtration procedures. The FilterTec™ R/P Step-Scan mode allows you to modify the pump rate and/or pump pressure over a selected time interval. For a particular process solution, an optimized DEF filtration procedure may require a pump rate scan, e.g. continuous changing of the pump rate, for example, from 25ml/min to 250ml/min over a user-selected time interval or filtrate volume. Similarly, the FilterTec™ allows you to implement a filter pressure scan, i.e. a procedure by which the filter inlet pressure changes linearly over time (see Figure 2) until the selected filtrate volume has been attained.

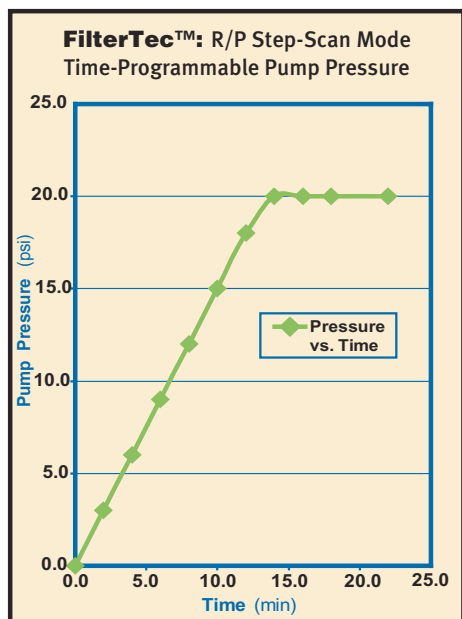


Figure 2

Vmax Determination

Dead-End Filtration (DEF) by either Constant Rate or by Constant Pressure can be readily implemented with the FilterTec™. For Vmax determinations, the Constant Pressure method is utilized (see Figure 3). In the FilterTec™ “P-Stat” mode, the pump output is rapidly ramped up at a selectable rate until a user-definable pressure limit is reached. The FilterTec™ maintains the selected pressure limit by modulating the pump output. With progressively increasing filter plugging, the pump output decays until a user-defined, low pump rate limit (e.g. 0.5 ml/min) has been attained, at which point the system will cease pumping.

The FilterTec™ collects and documents the filtrate weight utilizing an electronic scale. The parameter T/W, i.e. “Time/Filtrate Weight” is plotted against “Time”. The inverse of the resulting slope represents Vmax. The FilterTec™ reports the instantaneous Vmax from the slope of neighboring data points.

Alternatively, Vmax data can be obtained by the R/P Stat method (see Figure 1). In this case, the pump rate decay data collected under constant pressure conditions is used to calculate Vmax.

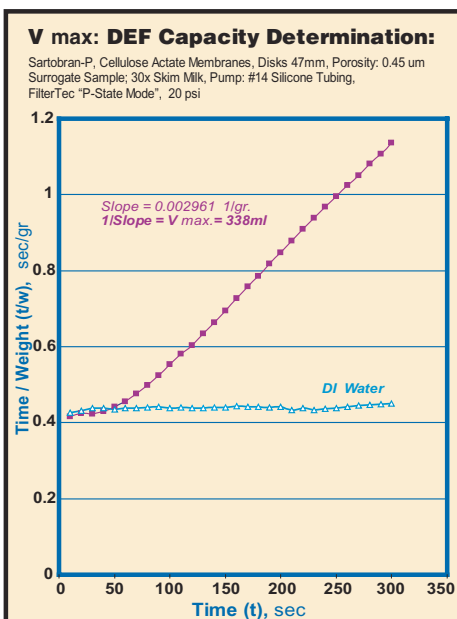


Figure 3

Automated Data Collection and Trend Graphing

The FilterTec™ displays up to fifteen (15) DEF-related parameters. You can scroll through three FilterTec™ display options, thereby obtaining an instantaneous overview of the filtration progress and status. When hooked up to a SciLog® printer, all information is printed out. Alternatively, a SciLog® application software, SciDoc, is used to summarize the filtration data and create graphical representations of the data on your personal computer (see Figure 4).

The SciLog®/SciDoc custom spreadsheet has three data fields: 1) Summary of all FilterTec™ related parameters including time/date stamp; 2) Information related to process solution and filter membrane. This information is filled in by the operator; and 3) PC display of up to 15 filtration related parameters that are updated at user-selected time intervals:

- MT Military Time, HH:MM:SS
- ST Pump Status: START, RUN, EXIT
- ET Elapsed Time
- AL FilterTec™ Alarms:  
e.g. HP for High Pressure
- FQ Filtrate Weight (Quantity)
- CRQ Constant Rate Quantity
- P1 Inlet Pressure, Filter #1
- CPQ Constant Pressure Quantity
- P2 Inlet Pressure, Filter #2
- T/W Time/Weight
- P3 Inlet Pressure, Filter #3
- Vmax Maximum Filtrate Volume
- FF Nominal Pump Rate
- FLUX Membrane Flux,  
liters/square meters/hour
- FP Filtrate Collection Rate (scale)
- CW Pump Direction



Figure 4

## specifications

<b>Dimension:</b>	Width: 5.75 in (14.6cm); Height: 8.5 in (212.6); Depth: 11in (27.9).
<b>Weight:</b>	14 lbs (6.4kg).
<b>Enclosure:</b>	16 Ga, aluminum baked epoxy blue.
<b>Pump Head/ Motor Options:</b>	<ol style="list-style-type: none"> <li>1. Tandem 1081 peristaltic pump head with 8 RPM motor. Flow range (depending on tubing size): 0.03 to 24 ml/min.</li> <li>2. Tandem 1081 peristaltic pump head with 160 RPM motor. Flow range (depending on tubing size): 0.5 to 554 ml/min.</li> <li>3. Tandem 1082 peristaltic pump head with 600 RPM motor. Flow range (depending on tubing size): 0.59 to 2,258 ml/min.</li> <li>4. Tandem 1081 peristaltic pump head with 600 RPM motor. Flow range (depending on tubing size): 2 to 1,500 ml/min.</li> </ol>
<b>Pressure Range: Tandem Head Pump</b>	Maximum pressure output at tandem peristaltic pump head is 45 psi. Has single point recalibration feature.
<b>Pressure Displayed:</b>	Pressure displayed with a resolution of 0.1 psi; choice of bar, psi, kpa.
<b>Pressure Sensors:</b>	Accommodates up to three (3) disposable pressure sensors. The calibrated pressure range is 0-60 psi. Any point within this range can be re-calibrated using an external pressure reference source.
<b>Power:</b>	115/220-240 VAC, 60/50Hz, 75 Watts; double fused: T1AL 250V (CE: IR35A 250VAC)
<b>Encoder:</b>	100 lines per motor revolution for 600 RPM motor. 120 lines per motor revolution for 8 and 160 RPM motors.
<b>FilterTec™ Balance Options:</b>	<ul style="list-style-type: none"> <li>• Balance with capacity of 2,000 grams x 0.01 g resolution included with FilterTec™ CP-8.</li> <li>• Balance with capacity of 8100 grams x 0.1 g resolution included with all other FilterTec™ models.</li> </ul>
<b>FilterTec™ Software:</b>	<p>Main menu with five operational modes including:</p> <ul style="list-style-type: none"> <li>• R/P Stat Mode: Constant Rate/Constant Pressure Filtration with six user-definable alarms.</li> <li>• P Stat Mode: Constant Pressure Filtration with six user-definable alarms.</li> <li>• R/P Step-Scan Mode: Automated continuous changing of pump rate or pressure with time.</li> </ul>
<b>Documentation Software for PC:</b>	<ul style="list-style-type: none"> <li>• SciDoc interface software with custom macros for Excel® for data compilation. Sent to you ready to use.</li> <li>• Complete process analysis with graphing of data.</li> <li>• Real-time verification and documentation of process parameters.</li> </ul>
<b>Use Range:</b>	4° to 40° C, 100% Humidity.
<b>Motor:</b>	Choice of three (3) motors: 8, 160 and 600 RPM at 30VDC, 3.8 Amperes, Variable Pump Speed, optically encoded servo-controlled motors.
<b>I/O Ports:</b>	<ol style="list-style-type: none"> <li>1) First serial port labeled "Balance", Male DB9 connector for hook-up of electronic scale.</li> <li>2) Second Serial Port labeled "Printer", Female DB9; also used to interface to PC for data storage in an Excel® file in your PC.</li> <li>3) External I/O port, Female DB37 connector; Used for remote On/Off control of FilterTec™ via footswitch.</li> <li>4) Pressure Sensor Box: Phone plugs for three(3) pressure sensors.</li> </ol>
<b>Data Entry:</b>	Membrane keyboard with auditory feedback.

## Summary of SciLog® Products

- High precision.
- Real-time data collection and graphing.
- User-friendly.
- Safe, walk-away system operation



- Each one optimizes a particular type of application.
- Built-in alarms and multiple I/O ports for interfacing with other devices, e.g. pressure sensors, balances, valves, printers, PCs, etc.

*Performance validations available for all SciLog® models.*

## SciLog® Intelligent Lab Systems

### FilterTec™ Dead End Filtration (DEF) System

- Filterability Studies and Vmax Determination
- SciDoc, Real-Time Data Collection of 15 Filtration Parameters and Graphing
- Increased DEF Filter Utilization up to 35%
- 3 Pressure Sensor Hook-ups for Filter Trains
- Safe, walk-away System Operation

### LabTec™ Smart Dispenser System

- Rapid, High Precision Dispensing/Filling, ml to liters
- Dispense by Weight or by Volume
- In-Line Filter Sterilization – Senses Filter Plug-up
- Sample Weighing and Auto-Diluting – Weight Ratio Capability
- Performance Validation sent with each LabTec™

### ChemTec™ Bioreactor Metering System

- Automated Feed Regulation with Cell Growth Monitor
- Programmed Linear or Exponential Feed by Weight or Volume
- Real-Time Data Collection and Graphing
- Programmable Control of Two 6-Port Rotary Valves
- Other Apps include: Automated pH, Diafiltration and Perfusion

### ACCU™ High Precision Digital Metering Pump

- High Precision Pump with Optically encoded Motor
- Proportional Pump Control: 4-20 mA or 0-5 VDC
- PC Interface Via Serial Port (RS-232); Footswitch Control
- Tachometer Output
- Available in Peristaltic, Piston and Magnetic Gear Models

### PureTec™ CrossFlow Filtration System

- Ideal for Lab Scale CrossFlow, TFF, Protein Concentration, Diafiltration and Protein Washing
- Controls and Monitors TMP (transmembrane pressure)
- Filtration with Constant TMP/Constant Feed Rate
- SciDoc, Real-Time Data Collection of 11 Filtration Parameters and Graphing

### SciDoc™ Real-Time Data Collection and Graphing Software

- Up to 15 fluid handling parameters
- Data Collected and Compiled
- Real-Time Data Sent to Excel® File and Graphs
- Custom Spreadsheet with Macros
- User Defined Time Intervals for Data Collection
- Data Used to Characterize and Optimize your Application



## SciLog® Intelligent Pilot Plant and Production Systems

### Fill Master Smart Large Volume Dispenser

- Washdown, Mobile, Smart
- Rapid, High Precision Dispensing/Filling, liters
- Dispense by Weight or by Volume
- In-Line Filter Sterilization – Senses Filter Plug-up
- Automated Aseptic Fill into Multiple, Single Use Storage Bags

### SciDoc™ Real-Time Data Collection and Graphing Software

- Up to 15 fluid handling parameters
- Data Collected and Compiled
- Real-Time Data Sent to Excel® File and Graphs
- Custom Spreadsheet with Macros
- User Defined Time Intervals for Data Collection
- Data Used to Characterize and Optimize your Application

### SciPure™ Automated TFF System

- Constant Flow Rate and Constant TransMembrane Pressure(TMP), Regardless of Viscosity Changes!
- Eliminates Operator adjustment of retentate line Pressure during TFF
- Control, Monitoring and Documentation of TMP, Inlet Pressure, Retentate Line Pressure, Permeate Line Pressure, Permeate Quantity, Permeate Collection Rate, etc.
- SciDoc: Real-Time Data Collection and Graphing

### SciPro™ Intelligent BioProcessing System

- Excellent Process Development Tool
- Programmable On-board Software for Purification and Chromatography
- Washdown, Mobile, Smart, High Precision
- 12 I/O ports to Interface with Scales, Sensors, PCs, Printers, etc.
- Pump Head Options: Peristaltic, Rotary Lobe, Magnetic Gear