SciLog® PureTec®

- intelligent bioprocessing system
- tangential flow filtration system

The SciLog® PureTec® is a laboratory-scale tangential flow filtration (TFF) and parameter development system.

The PureTec® system is delivered as a complete development system including three pressure sensors, an 8.1kg balance, a 500mL vessel with magnetic stirrer and startup kit including tubing and fittings. Methods can be performed using constant or step cross flow, inlet or transmembrane pressure (TMP).

The automatic documentation and alarm / pump stop settings allow the user to focus on other tasks while the system is running. Programmable end points ensure the system stops operating when a user defined concentration or diafiltration is reached. When sold with SciDoc software or a printer, documentation capabilities include 17 real-time filtration parameters such as TMP, permeate flow rate and quantity, Normalized Water Permeability (NWP), concentration factor, and other parameters over time.

Features and Benefits

- Complete development system
- Real-time data collection with optimization tools
- Scalable parameters, easy tech transfer
- Flow and automated pressure control
- Safe, walk away system operation
- Intuitive application interface

Note: SciLog® & PureTec® are registered trademarks of Parker Hannifin Corporation.

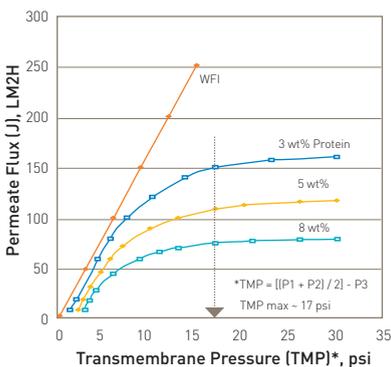## Performance Characteristics

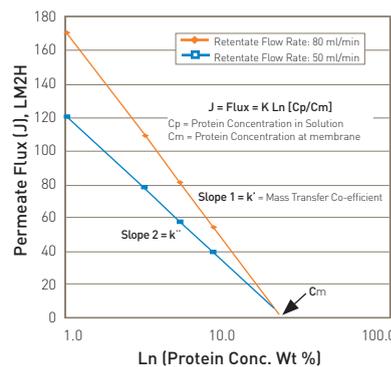
Fig. 1 - Transmembrane Pressure vs. Permeate Flux

Fig. 2 - Ln [Protein Conc, (CP)] vs. Permeate Flux (J)

In TFF, concentration procedures, a dilute protein solution (~1.0 g/L) is re-circulated, through a TFF filter whose selected porosity allows only solvent (water) and dissolved salt to pass through the filter pores and is collected as permeate. The removal of water leaves an increasingly concentrated protein solution behind as retentate. The gradual removal of water causes a gradual increase in solution viscosity during the TFF concentration step. Permeate flux, transmembrane pressure (TMP) and cross flow rate are significantly affected by solution viscosity changes.

In order to maintain an optimal permeate flux, both cross flow rate and measured TMP require frequent, manual adjustment during the TFF concentration procedure. The PureTec® has the control methods to perform the operation automatically via constant or stepped cross flow rate, inlet pressure or transmembrane pressure. The system will automatically stop when the user defined concentration factor has been reached.

Applications

Concentration
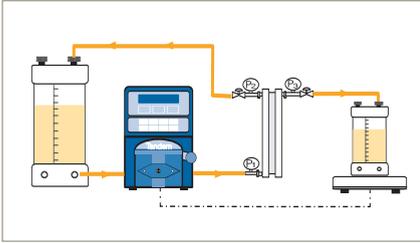
In the constant pump rate or pressure modes, you can implement your selected pump rate or pressures and use some or all of five alarm conditions. The pump rate or pressures can be increased or decreased "on-the-fly" without stopping the pump action.

In the constant rate mode, increasing the feed rate in a stepwise fashion and simultaneously monitoring the permeate collection rate allows you to readily determine the optimal feed rate with the highest permeate yield (See figure 2).

In the constant pressure mode, increasing the trans-membrane pressure (TMP) in a step-wise fashion and simultaneously monitoring the permeate collection rate allows you to determine the optimal TMP with the highest permeate yield (See figure 1).
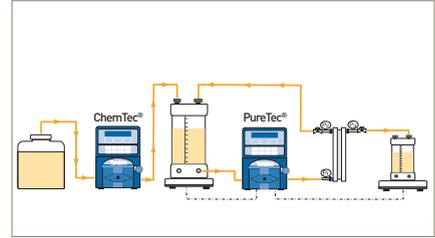
Diafiltration via Suction
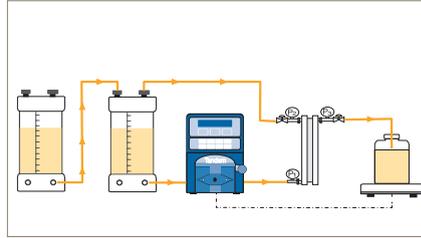
In diafiltration procedures, a protein solution is "washed", i.e. de-salted, using an exchange buffer to remove undesirable electrolyte (dissolved salt). The concentrated protein solution is re-circulated, through a TFF filter whose selected porosity allows only the undesirable electrolyte to pass through the filter pores, which is collected as permeate. The permeate volume (undesirable electrolyte) that has been removed from the concentrated protein solution (retentate) is replaced with an (desirable) exchange buffer. In constant volume diafiltration or "washing" procedure, the collected electrolyte is automatically replaced by an equal volume of exchange buffer. Approximately ten (10x) volume exchanges are typically required for substantial removal of undesirable electrolyte from the concentrated protein solution.

Diafiltration via suction:
For small volumes a SciLog® pressure vessel stored with buffer can be connected to the secondary inlet port on the retentate vessel. While keeping a closed system the retentate vessel will automatically draw out buffer to replace the salt and solvent that has been removed by the filter. The process will continue until the PureTec® has reached its programmable end points.

Diafiltration via ChemTec®

Diafiltration via ChemTec®:
For larger volumes the SciLog® ChemTec® system and an appropriately sized balance will monitor and maintain the fluid in the PureTec®'s retentate vessel. The ChemTec® will maintain the level until a user defined volume exchange has been reached.

Specifications

	Description
Dimension / Weight	Width: 5.75¨ (146 mm) x height: 8.5¨ (2126 mm) x depth: 11¨ (279 mm): 14 lbs (6.4 kg)
Enclosure & Rating	16 Ga, aluminium baked epoxy blue 4-40dC, 0-100% humidity, IP20
Pressure Sensors	Accommodates three disposable pressure sensors. The calibrated pressure range is 0 - 60 psi. Any point within this range can be recalibrated using an external pressure reference source.
Power	115 / 220-240 VAC, 60 / 50 Hz, 75 Watts, double fused: T1AL 250V (CE: IR35A 250VAC)
Motor / Encoder	8, 160, 600 30 VDC, 3.8A, 120 ppr 8 & 160 RPM, 100 ppr 600 RPM
I/O Ports	Male DB9 scale connections (RS-232), female DB9 printer or PC connection (RS-232), external IO DB37 connector, 1 TTL input, 4 TTL output, 3 4-20mA Analog Input: Constant rate / constant pressure filtration with size user-definable alarms
Operational Mode	Constant pump rate, constant inlet or transmembrane pressure (TMP)

Options and Accessories

Pump Heads: SciLog Tandem

- Pressure: 25 psi continuous
        45 psi max.
- 1081 flow rate (ml/min): 0.03 - 1515
- 1082 flow rate (ml/min): 0.5 - 2258

Accessories

- Ohaus balance   8200g
        0.1g resolution
- Vessel   500 mL
- Magnetic mixer

- Pressure sensors   (3x)
- Fittings & tubing kit

Ordering Information

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Code	Scale	Code	Motor	Code	Pump Head
7	Scale Included	0	8 RPM		SciLog
		1	160 RPM	81	1081 Pump
		6	600 RPM	82	1082 Pump

Example: 200-PURE-7181 - SciLog® PureTec® - with scale, 160 RPM motor and 1081 head