PURETEC™ II TFF LAB SYSTEM

Intelligent bioprocessing system for tangential flow filtration

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

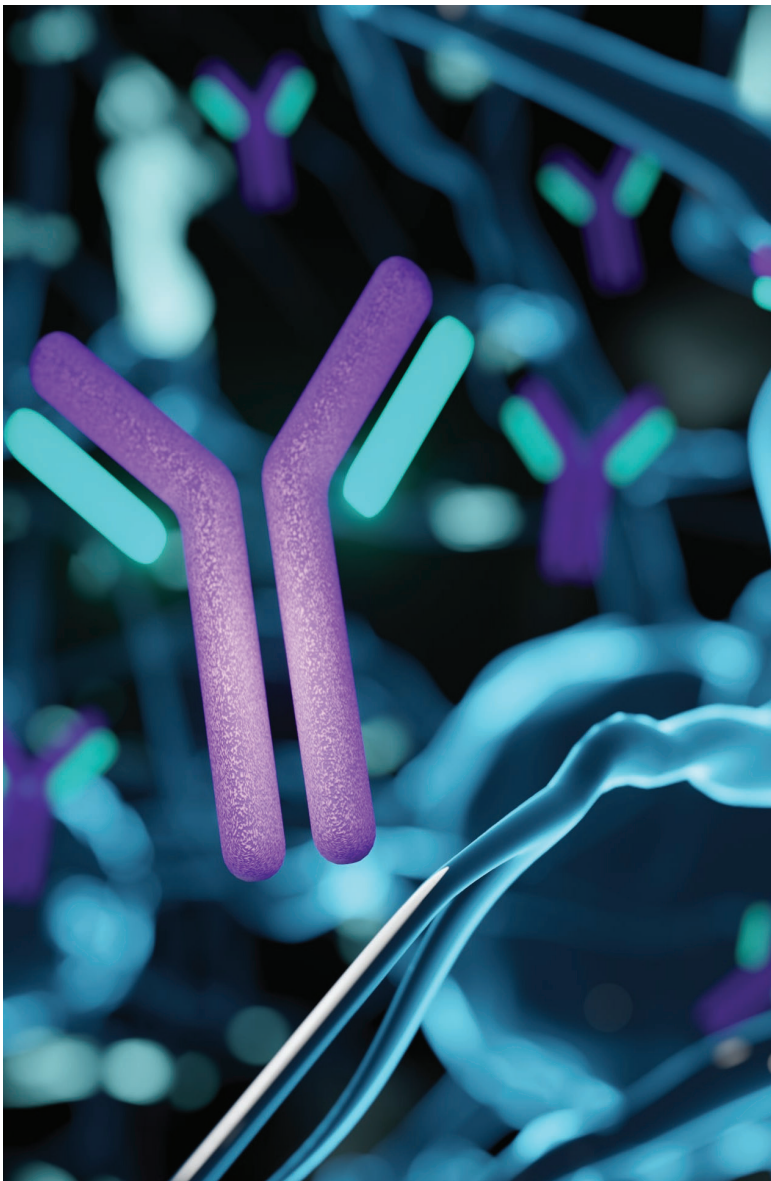
The PureTec II can be delivered as a complete development system which includes 3 SciPres II sensors, an 8.1kg balance, optional vessel sizes with magnetic stir bar, and a tubing and fittings kit. Methods can be performed using constant or step cross flow, inlet or transmembrane pressure (TMP).

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 connected to a computer with SciDoc software, documentation capabilities include real-time filtration parameters such as TMP, permeate flow rate and quantity, Normalized Water Permeability (NWP), concentration factor, and other parameters over time.

Currently available in North America only.

Features & 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



Performance Characteristics

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.

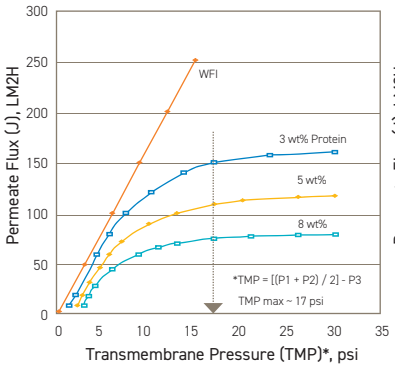


Fig. 1 - Transmembrane Pressure vs. Permeate Flux

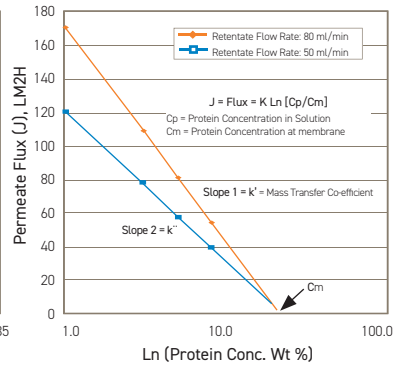
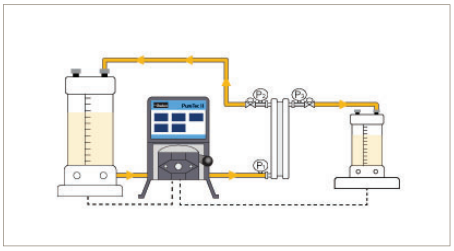


Fig. 2 - Ln [Protein Conc, (CP)] vs. Permeate Flux (J)

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® II has the control methods to perform the operation automatically via constant or stepped cross flow rate, control pressure or trans-membrane pressure. This can be accomplished with pump RPM control or with our automated valve. The system will automatically stop when the user defined concentration factor has been reached.

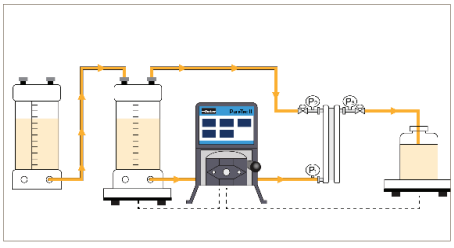
Applications

Concentration

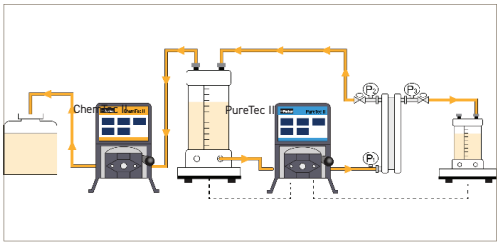


In constant pump rate or pressure mode, you can implement your selected pump rate or pressures and use some or all five alarm conditions. The pump rate or pressures can be increased or decreased "on-the-fly" without stopping the pump action. In constant rate mode, increasing the feed rate in a stepwise fashion and simultaneously monitoring the permeate collection rate allows you to determine the optimal feed rate with the highest permeate yield (See figure 2 above). In constant pressure mode, increasing the trans-membrane pressure (TMP) in a stepwise fashion and simultaneously monitoring the permeate collection rate allows you to determine the optimal TMP with the highest permeate yield (See figure 1 above). Automated pressure control via the control valve further enhances productivity by removing manual intervention while also leveraging the real time monitoring capabilities.

Diafiltration via Siphon



Diafiltration via ChemTec® II



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 Siphon:
For small volumes a 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® II has reached its programmable end points.

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

Specifications

Item	Description
Power	100-240 VAC, 50/60 hz, 3.15 A
Industry Specifications	REACH, ROHS, WEEE
Dimensions	9.5 in. (24.1 cm) W x 11.5 in. (29.2 cm) H x 13.4 in. (34 cm) D
Weight	16.2 lbs / 7.43 kg
Pressure Sensor Range	0-60 psi
I/O Ports	SciPres II pressure sensors (3), SciTemp II temperature sensors (3), serial balance input (3), RS232 serial port (1) for SciDoc II data collection (USB adapter cable included), digital outputs (8) - 6 intended for remote pump control, 4 - 20 mA analog outputs (8) - for pump / drive or valve proportional control, 4 - 20 mA analog inputs (4) - 1 dedicated to pH input

Motor RPM/Pump Head Choices

Pump Head Model		TANDEM 1081						TANDEM 1082		
Approved Tubing Size		13	14	16	25	17	18	15	24	35
Silicone Part #		400-113	400-114	400-116	400-125	400-117	400-118	400-115	400-124	400-135
PharMed Part #		400-313	400-314	400-316	400-325	400-317	400-318	400-315	400-324	400-335
Pump Rate Range (Nominal values, +/-5%)		ml/min	ml/min	ml/min	ml/min	ml/min	ml/min	ml/min	ml/min	ml/min
CP-120	160 RPM	0.5 - 10	1.7 - 35	6.3 - 129	12.5 - 283	18.5 - 405	24.7 - 554	9.6 - 240	14 - 412	16-650
CP-200	600 RPM	2 - 34	8.6- 132	29 - 533	49 -974	70 - 1048	103 - 1515	59-993	85-1348	111 - 2258

Ordering Information

PURE2 – [ ] [ ] – [ ] [ ] [ ]

Code	Motor (RPM)
2	160
3	600

Code	Pump Head
1	1081
2	1082

Code	Retentate Vessel Size (mL)
Blank	No vessel
1	50
2	500
3	1000

Code	Permeate Vessel Size (mL)
Blank	No vessel
1	50
2	500
3	1000

Code	Control Valve Size
Blank	No valve
1	Small
2	Large

Options & Accessories

Tandem Pump Heads

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: 50, 500 or 1000 mL
Magnetic mixer: 1
Pressure sensors: (3x) Luer
Fittings & tubing kit: 1

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