Application matrix for crossflow filtration

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GE Healthcare
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Application matrix for crossflow filtration

System	Application, Cartridge selection for trial process and scale-up	Surface Area in (m^2)	Starting Volume (liters)	Recirculation Flow Rate (lpm)	Inlet Pressure (psig/barg)	Outlet Pressure (psig/barg)	Permeate Flow Rate (ml/min)	Permeate Volume/Process Time (liters/ hours)	Target Time (hours)
E. coli **Harvest** (10X concentration, 3X diafiltration) Average flux ~25 lmh with high cell density starting material, unrestricted permeate. Recirculation flowrate is ramped up to 8000/sec shear initially and TMP set at 1 barg. Note: this process description is for optimal recovery and washing of cells only.									
ÄKTAcrossflow™	UFP-500-E-3X2MA	0.023	1	0.6	17/1.2	13 / 0.9	9.4	1.2 /2.1	~2
UniFlux™ 10	UFP-500-E-6A	0.28	15	8.0	17/1.2	13 / 0.9	116.7	18/2.6	~2
UniFlux 30	UFP-500-E-9A	0.84	50	24.5	17/1.2	13 / 0.9	350	60/2.9	~2-4
UniFlux 400	(2) UFP-500-E-65	8.8 (total)	1,000	245	17/1.2	13 / 0.9	3,667.0	1200/5.5	~6
E. coli **Lysate Clarification** (dilute to <10% solids, then 2X concentration, 4X diafiltration) Permeate Flow Control at 10 lmh, no retentate backpressure. Recirculation flowrate is ramped up to 8000/sec shear initially. Note: this process description is for removal of cell debris and optimal recovery of intracellular protein only.									
ÄKTAcrossflow	CFP-1-E-3X2MA	0.023	0.2	0.6	6 / 0.4	2 / 0.1	3.8	0.25/1.1	~2
UniFlux 10	CFP-1-E-4X2A	0.085	0.75	2.4	6 / 0.4	2 / 0.1	14.2	1.9/2.2	~2
UniFlux 30	CFP-1-E-9A	0.84	15	24.5	6 / 0.4	2 / 0.1	140.0	37.5/4.5	~2-4
UniFlux 400	(2) CFP-1-E-65	8.8 (total)	200	245.0	6 / 0.4	2 / 0.1	1467.0	500/5.7	~6
Pichia pastoris **Cell Clarification** (4X diafiltration) Permeate Flow Control at 25 lmh, 2 psig retentate backpressure. Recirculation flow rate is ramped up to 6000/sec shear as listed. (Due to viscosity of yeast culture, the process may not allow more than 4000/sec.) Note: this is for removal of yeast cells and optimal recovery of expressed protein.									
ÄKTAcrossflow	CFP-1-E-3MA	0.011	0.16	0.45	6 / 0.4	2 / 0.1	4.6	0.64/2.3	~2
UniFlux 10	CFP-1-E-5A	0.12	2.0	6.0	6 / 0.4	2 / 0.1	50	8.0/2.7	~2
UniFlux 30	CFP-1-E-35A	0.92	25	45	6 / 0.4	2 / 0.1	383	100/4.4	~2-4
UniFlux 400	(2) CFP-1-E-45	5.0 (total)	200	184	6 / 0.4	2 / 0.1	2,083	800/6.4	~6
Mammalian Cell Clarification (20X concentration/3X diafiltration) Permeate Flow Control at 30 lmh, no retentate backpressure. Recirculation flow is ramped up to 8000/sec shear. (For shear sensitive feed streams use ½ flow given for 4000/sec.) Note: this is for removal of cell debris and optimal recovery of expressed target protein									
ÄKTAcrossflow	CFP-4-E-3X2MA	0.023	1	0.6	6 / 0.4	2 / 0.1	11.3	1.1/1.6	~2
UniFlux 10	CFP-4-E-6A	0.28	20	8.0	6 / 0.4	2 / 0.1	140	16.5/2.0	~2
UniFlux 30	CFP-4-E-9A	0.84	60	24.5	6 / 0.4	2 / 0.1	420	66/2.6	~2-4
UniFlux 400	(2) CFP-4-E-65	8.8 (total)	1500	245	6 / 0.4	2 / 0.1	4,400	1650/6.25	~6
Protein [IgG] Concentration (20X concentration/5X diafiltration) Higher TMP and 8,000/sec shear, average flux 30 lmh. (60 LMH for Kvick) Recirculation flowrate is ramped up to 8000/sec shear. (For shear sensitive feed streams use ½ flow given for 4000/sec.) Note: this is for retention of protein and passage of cell culture media components									
ÄKTAcrossflow	UFP-30-C-3X2MA	0.029	1	0.25	20 /1.4	12 / 0.8	14.5	1.2/1.4	~2
UniFlux 10	UFP-30-C-6A	0.28	25	4.4	20 /1.4	12 / 0.8	240	30/2.1	~2
UniFlux 30	UFP-30-C-55	3.25	200	28	20 /1.4	12 / 0.8	1625	240/2.5	~2-4
UniFlux 400	(4) UFP-30-C-65 **	24.4 (total)	4000	224	20 /1.4	12 / 0.8	12200	4800/6.6	~6
ÄKTAcrossflow	Kvick UFELA0030001ST	0.01	1	0.08	25 / 1.7	15 / 1.0	10 1.2/2.0	~2	
UniFlux 10	(5) UFELA0030010ST	0.55 (total)	80	4.3	25 / 1.7	15 / 1.0	550	96/2.9	~2-4
UniFlux 30 (10)	UFEFL0030050ST	4.64 (total)	600	35.4	25 / 1.7	15 / 1.0	4640	720/2.6	~2-4
UniFlux 400	(12) UFEFL0030250ST	18.64 (total)	7000	212	25 / 1.7	15 / 1.0	27800	8400/5.0	~6

NOTES: Flux estimates are conservative, actual flux may be higher. Δ P numbers are estimates, conditions may vary depending on viscosity, temperature etc. Above estimates should be verified by appropriate process optimization at smaller scales. Contact GE Healthcare for details.

** UniFlux 400 can process with to (4) UFP-30-C-85 for a total of 52 m2 area, but the use of these 110 cm path length should first be tested at smaller scale. Systems such as QuixStand™ FlexStand™ and GrandStand™ offer manually operated alternatives to the automated systems listed above.

imagination at work

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