

Vivascience Vivacell 250

The Vivacell 250 is a gas pressurised ultrafiltration system used for processing biological samples in the 50 - 250 ml range. Vivacell 250 can be used as a bench top concentrator or, for faster processing, in conjunction with a laboratory shaker capable of handling 1 litre bottles.

The innovative design solves the problems associated with traditional stirred cells whilst adding extra performance and flexibility. Vivacell 250 is inexpensive, quick and easy to assemble, requires no stirring mechanisms and cannot be concentrated to dryness.

The unique replaceable membrane insert allows rapid change of membranes to give greater flexibility, productivity and process control. The conical dead stop built into the bottom of the membrane insert allows concentrations to under 1 ml.



Bench Top Operation

The Vivacell 250 can be used as a bench top concentrator. When used in conjunction with the Vivascience Air Pressure Controller, (Product No. VCA002), the quick release inlet connector seals on dis-connection, allowing multiple devices to be charged with up to 4 bar pressure and left to concentrate. For even faster processing, single samples can be concentrated under constant pressure.

Operation on Laboratory Shaker

Samples can be processed just as simply, and even faster by using an orbital laboratory shaker. Slow vortex action provides enhanced control of concentration polarisation, the constant swirling action reducing the build up of molecules on the membrane surface. Since only gentle motion is necessary the shearing effects typical of stirring mechanisms, are greatly reduced.

Equipment Required

1. Vivascience Air Pressure Controller (Product No: VCA002) or equivalent pressure regulator.
2. Pasteur or fixed volume pipettes for sample delivery and recovery.

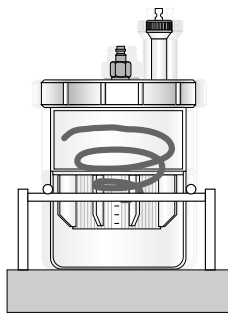
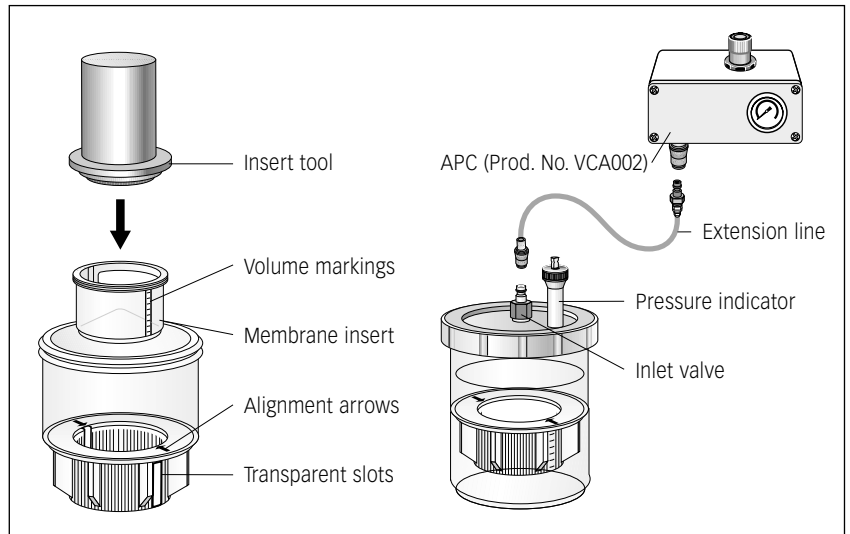
Optional Equipment

Orbital Shaker accepting 1 litre bottles, (minimum stroke/orbit of 10 mm, minimum shaking frequency 170 RPM).

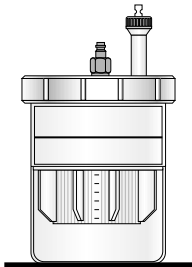
Operation

Assembly

1. Select the most appropriate membrane cut-off for your sample. For maximum recovery select a MWCO at least 50 % smaller than the molecular size of your target molecule.
2. Line up the volume markings on the membrane insert with the transparent slots and alignment arrows in the sample reservoir and push down. Ensure the insert is fully seated by applying firm, even pressure with the insert tool. When installed correctly, the top of the insert should be level with the floor of the sample reservoir.



Shake



Stand on bench



Recover

Concentration

3. Fill with 50-250 ml, of sample solution.
4. Fit pressure head and hand tighten to ensure an air tight seal.
5. Using Vivascience Air Pressure Controller (APC). Set controller to desired pressure by lifting regulator knob to unlock and turning in the appropriate direction (4 bar is recommended for most applications). Pressurise the concentrator assembly by connecting to the inlet valve on the pressure head.
 - a. To process single samples under constant pressure leave connected to APC extension line.
 - b. To charge multiple samples disconnect female connector by raising the outer locking sheath, and pressurise the next assembled device.One charge is normally sufficient to fully concentrate samples up to 150 ml. With larger volumes recharging may be necessary.
6. Leave to concentrate. For faster processing, place on laboratory shaker and agitate gently at approximately 200-300 rpm. Avoid high speed shaking, as this is unnecessary and can cause foaming. Leave to concentrate. (See usage tips and table 1. for guide on concentration times.)

Concentrate Recovery

7. Once desired concentration level has been reached depressurise concentrator assembly by releasing air from the centre of the inlet valve with a pointed instrument.
8. For maximum recovery, allow to stand after de-pressurisation for 10 - 15 minutes and then extract concentrate using a Pasteur or fixed volume pipette.

Insert Removal

Place the sample reservoir upside-down on a bench and push the insert down and out using the insert tool.

Usage Tips

1. Flow Rate

Filtration rate is affected by several parameters, including membrane cut-off, sample concentration, viscosity, pressure and temperature. Expect significantly longer process times for starting solutions with over 5 % solids. When operating at 4° C. flow rates are approximately 1.5 times slower than at 25° C. Viscous solutions such as 50 % glycerine will take up to 5 times longer to concentrate than samples in a predominantly buffer solution.

2. Prerinsing

Membranes fitted to Vivacell concentrators contain trace amounts of glycerine. Should this interfere with analysis this can be removed by placing approximately 200 ml of buffer solution or deionised water in the concentrator. Pressurising using one of the methods detailed above and allowing 100-150 ml to pass through the membrane. De-pressurise the device, then decant filtrate and concentrate before processing sample solution.

3. Sterilisation

Vivacell concentrators are not autoclaveable. To sterilise, use a 70 % ethanol solution or sterilising gas mixture.

4. Chemical Compatibility

Vivacell concentrators are designed for use with biological fluids and aqueous solutions. For chemical compatibility, refer to table 3.

5. Desalting or Buffer Exchange

- I. Concentrate sample to desired level.
- II. Empty filtrate container.
- III. Refill concentrator with an appropriate solvent.
- IV. Concentrate the sample again and repeat the process until the concentration of contaminating microsolute is sufficiently reduced. Typically 3 wash cycles will remove 99 % of initial salt content.

6. Cleaning and sanitising

Vivacell concentrators may be used several times if recommended cleaning and storage instructions are adhered to, and the membrane is not allowed to dry.

- I. Rinse out the device several times with deionized water.
- II. Fill the assembled concentrator with a solution of 60 % ethanol and 40 % 1M HCl. Alternatively, fill the concentrator with a dilute non ionic surfactant and allow to soak for 1-2 hours. For best results, agitate on a laboratory shaker for approximately 30 minutes.



WARNING: *Strong alkaline solutions should not be used.*

- III. Rinse thoroughly with clean water before re-use or storage.

7. Storage

Following cleaning, Vivacell membrane inserts may be stored for several weeks in a 20 % ethanol solution. For best results, fill filtrate container or suitable beaker with solution, place membrane insert upright in the container. Ensure that the insert is fully submerged in the solution. This procedure will ensure that the membrane remains wetted throughout storage. Close with laboratory film and preferably keep refrigerated.

Table 1: Technical Specifications

Specifications	
Concentrator capacity	50 - 250 ml
Max pressure	4 bar (60 psi)
Active membrane area	40 cm ²
Hold-up vol. memb. & support	<200 µl
Dead stop volume	600 µl
Dimensions	
Width Ø	116 mm
Height (incl. pressure indicator)	235 mm
Materials of construction	
Screw closure	Acetal
Pressure head	Acetal
Quick release connector	Acetal
Concentrator body/sleeve	Polycarbonate
Filtrate container	Polycarbonate

Table 2: Performance Characteristics

Typical performance	100 ml Start Volume			250 ml Start Volume		
	Time Min.		Solute	Time Min.		Solute
20 x concentration 4 bar pressure	Orbital Shake	Free Standing	Recovery %	Orbital Shake	Free Standing	Recovery %
BSA 1.0 mg/ml (66,000 MW)						
5,000 MWCO PES	19	70	98 %	40	140	99 %
10,000 MWCO PES	12	45	97 %	28	100	98 %
30,000 MWCO PES	12	45	96 %	28	100	98 %
γ Globulins 0.25 mg/ml (160,000 MW)						
30,000 MWCO PES	25	120	96 %	55	240	98 %
50,000 MWCO PES	25	120	94 %	55	240	98 %
100,000 MWCO PES	25	120	96 %	58	240	98 %

Table 3: Chemical Compatibility

Solution		Solution	
Acetic Acid (25.0 %)	OK	Methanol (60 %)	OK
Acetone (10.0 %)	NO	Nitric Acid (10.0 %)	OK
Acetonitrile (10.0 %)	OK	Phenol (1.0 %)	OK
Ammonium Hydroxide (5.0 %)	?	Phosphate Buffer (1.0 M)	OK
Ammonium Sulphate (sat)	OK	Polyethylene Glycol	OK
Butanol (70 %)	OK	Pyridine	NO
Chloroform (1.0 %)	NO	Propanol 70 %	OK
Dimethyl Formamide (10.0 %)	NO	Sodium Carbonate (20 %)	OK
Dimethyl Sulfoxide (5.0 %)	OK	Sodium Deoxycholate (5.0 %)	?
Ethanol (70.0 %)	OK	Sodium Dodecylsulfate (0.01 M)	OK
Ethyl Acetate	NO	Sodium Hydroxide	NO
Formaldehyde (30 %)	OK	Sodium Hypochlorite (200 PPM)	NO
Formic Acid (5.0 %)	OK	Sodium Nitrate (1.0 %)	OK
Guanidine HCl (6 M)	OK	Sulfamic Acid (3.0 %)	OK
Hydrocarbons, aromatic	NO	Tetrahydrofuran (5.0 %)	NO
Hydrocarbons, chlorinated	NO	Toluene (1.0 %)	NO
Hydrochloric Acid (1 N)	OK	Trifluoroacetic Acid (10 %)	OK
Imidazole (50 mM) (2 hr contact time)	OK	Tween 20 (0.1 %)	OK
Lactic Acid (50.0 %)	OK	Triton X-100 (0.001 M) (0.06 %)	OK
Mercaptoethanol (10 mM)	OK	Urea (8 M)	OK

OK = Acceptable ? = Questionable NO = Not recommended

Ordering Information		
Vivacell 250		
	Pack Size	Prod. No.
Vivacell 250 complete with pressure head, pressure indicator/over-pressure release valve, quick release connection to APC, 2 sample reservoirs, filtrate containers & insert tool	1	VCA250
Vivacell 250 Maintenance Kit (Includes one sample reservoir and filtrate container, and "O" ring seals for pressure head)	1	VCA009
Air Pressure Controller (APC) complete with pressure gauge, regulator, over-pressure safety valve, female connector to Vivascience pressure products and 1 m extension line (4 mm pneumatic tube) with male and female connectors and 6 mm tube	1	VCA002
Replacement pressure head & locking ring	1	VCA015
Female connector	1	VCA010
Male connector	1	VCA011
Replacement Pressure Indicator/Over pressure relief valve	1	VCA008
4 mm OD Pressure tubing (3 m)	1	VCA012
Vivacell 250 Membrane Inserts		
5,000 MWCO PES	5	VC2511
10,000 MWCO PES	5	VC2501
30,000 MWCO PES	5	VC2521
50,000 MWCO PES	5	VC2531
100,000 MWCO PES	5	VC2541
Starter Kit (One of each membrane MWCO)	5	VC25S1

Vivascience Technical Support		Phone	Fax	E-mail
USA	Vivascience Service & Technical Support	+1 877 452 2345 (toll free)	+1 631 254 4253	info.usa@vivascience.com
Europe	Vivascience Support Center	+49 1 802 000 581 (toll free)	+49 1 802 000 583	info@sc.vivascience.com
International	Vivascience Support Center	+49 551 38906 0	+49 551 38906 11	info@sc.vivascience.com
Vivascience Customer Sales				
France	Vivascience S.A.R.L.	+33 169 19 93 23	+33 160 13 95 05	info.france@vivascience.com
Germany	Vivascience AG	+49 551 308 4023	+49 551 308 3289	info.germany@vivascience.com
UK	Vivascience Ltd.	+44 1372 737 159	+44 1372 726 171	info.uk@vivascience.com
USA	Vivascience Inc.	+1 877 452 2345	+1 760 918 8281	info.usa@vivascience.com

Vivascience AG

Feodor-Lynen-Strasse 21 Phone: +49 511 524875-0 E-mail: info@vivascience.com
30625 Hannover, Germany Fax: +49 511 524875-19 Web: www.vivascience.com



Vivacell 250

Technical data and operating instructions.
For in vitro use only.