

# Vivascience Vivacell 70

The Vivacell 70 concentrator is a disposable ultrafiltration device for use in swing bucket or fixed angle centrifuges accommodating 250 ml bottles, or as a gas pressurised assembly for use on a laboratory shaker. For faster concentrations gas pressure can be combined with centrifugation.

The innovative design (US Pat No. 5,647,990, second patent pending), solves the problems associated with traditional stirred cells whilst adding extra performance and flexibility. Vivacell 70 is inexpensive, quick and easy to assemble, requires no tubing connections or stirring mechanisms and cannot be concentrated to dryness.



## Centrifugal Operation

The Vivacell 70 can be used in any centrifuge accepting 250 ml bottles. At just 1,000 xg and typically in less than 30 minutes up to 70 ml samples will be concentrated 50X and more, the built in dead stop impeding concentration to dryness. For large volumes and multiple samples four or more concentrators may be used, expanding volume capability to well over 250 ml.

## Pressurised Bench Top Operation

The Vivacell 70 can be pressurised and left to concentrate standing on a bench top, or in a refrigerator for maximum process control with minimum equipment requirements.

## Pressurised Operation on Laboratory Shaker

Single samples of up to 70 ml can be processed just as simply by using the Vivacell 70 Pressure Head and an orbital laboratory shaker. Assembly just takes a few seconds, whilst a single pressure charge is sufficient to reduce 50 ml to less than 2 ml in typically less than 20 minutes.

## Pressure-Fugation

Combining the advantages of both centrifugal and pressurised operation, Pressure-Fugation is recommended for viscous or difficult solutions such as serum, or when refrigeration is required which would otherwise slow the process. Samples of up to 50 ml can be processed, in typically less than 15 minutes.

## Equipment Required

### A. For use with Centrifuge

1. Centrifuge with swing bucket or fixed angle rotor (minimum 25°).
2. 250 ml centrifuge bottles for filtrate collection. (Product No. VSA003). Bottles with modified caps are required for use in fixed angle rotors (Prod No: VCA004).
3. Pasteur or fixed volume pipettes for sample recovery.

### B. For use with Gas Pressure

1. Vivacell 70 Pressure Head and 250 ml filtrate bottle (Product No. VCA700)
2. Vivascience Air Pressure Controller (Product No. VCA002) or equivalent pressure regulator.
3. Pasteur or fixed volume pipettes for sample recovery.

## Optional Equipment

Laboratory orbital shaker accepting 250 ml bottles.

### C. For use with Pressure-Fuge

1. Vivacell 70 Pressure-fuge Head (Product No. VCA701).
2. Charge Valve for Pressure-fuge Head (Product No. VCA005).
3. Vivascience Air Pressure Controller (Product No. VCA002) or equivalent pressure regulator.
4. Centrifuge with swing bucket or fixed angle rotor (minimum 25°).
5. Pasteur or fixed volume pipettes for sample recovery.

## Operation

1. Select the most appropriate membrane cut-off for your sample. For maximum recovery select a MWCO at least 50% smaller than the molecular weight of your target molecule.
2. Place concentrator in filtrate bottle and fill with 10-70 ml (10-50 ml using Pressure-Fugation), of sample solution. Seal with Santoprene cap provided. In fixed angle rotors, modified bottle caps, (Prod No. VCA004), are also required.

### A. Centrifuge

3. Insert assembled concentrator into centrifuge, in swing bucket rotors a specific device orientation is not necessary. In fixed angle rotors the device should be aligned with the concentration chamber window facing upwards/outwards (see diagram below).
4. Once the desired concentration is achieved (see table 3 for guide on concentration times), remove assembly and recover sample from the bottom of the concentrate pocket with a pipette.

### B. Using Gas Pressure

3. Attach Pressure Head (VCA700) to concentrator assembly and hand tighten to ensure an air tight seal.

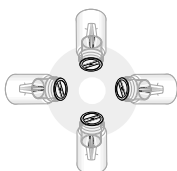
- 4a. Set APC regulator to desired pressure (a pressure release valve factory set at 5bar does not allow operation above this pressure). Lift regulator knob to unlock and turn in the appropriate direction (4bar is recommended for most applications). Attach assembly to the female coupling to charge the Pressure Head. Detach from coupling by raising the outer locking sheath. One charge is normally sufficient to fully concentrate the sample.
- 4b. It is possible to use the concentrator assembly under constant pressure by attaching a female coupling (Prod. No. VCA010), to the extension line from the APC then attaching this female coupling to the Pressure Head as in 4a.
5. Leave to concentrate. For faster processing place on laboratory shaker and agitate gently at approximately 200-300 revs. a minute. Avoid high speed shaking as this is unnecessary and can cause foaming.
6. Once desired concentration level has been reached (see table 3 for guide on concentration times) remove assembly and de-pressurise by unscrewing Pressure Head or by releasing air from the centre of the inlet valve with a pointed instrument.

7. For maximum recovery, allow to stand after de-pressurisation for 10-15 minutes and then extract concentrate using a Pasteur or fixed volume pipette.

### C. Combining Gas Pressure with Centrifuge

3. Replace Santoprene cap with Santoprene seal supplied with Pressure-Fuge Head (VCA701). Attach Pressure-Fuge Head and hand tighten to ensure an air tight seal.
4. Attach Charge Valve (Prod No.VCA005) to APC extension line. After setting controller to desired pressure, as above, pressurise the concentrator assembly by pressing Charge Valve in to inlet valve on Pressure - Fuge Head. (Ensuring a gas tight seal).
5. Insert assembled concentrator into centrifuge and spin at maximum speeds shown in table 1.
6. Once desired concentration level has been reached, (See table 3 for guide on concentration times and spin speeds.) remove assembly and de-pressurise by unscrewing Pressure-Fuge Head.
7. Recover concentrate using a Pasteur or fixed volume pipette.

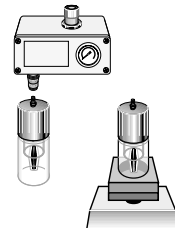
### Centrifuge



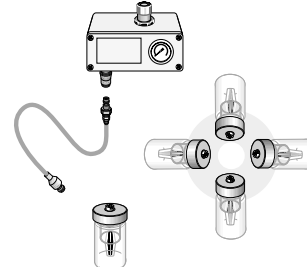
### Pressurise



### Pressure Shake



### Pressure Fuge



**Table 1: Recommended Spin Speed (x g)**

Mode	Centrifugal			Pressure-Fuge (5 bar max.)		
	min.	typical	max.	min.	typical	max.
5-50,000 MWCO PES	700	1,000	1,200	500	1,000	1,000
100,000 MWCO PES	700	1,000	1,200	500	1,000	1,000
PES 0.2 µm PES	700	1,000	1,200	500	1,000	1,000

**Usage Tips**

**1. Flow Rate**

Filtration rate is affected by several parameters, including membrane cut-off, sample concentration, viscosity, centrifugal force, pressure and temperature. Expect significantly longer spin 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 rinsing approximately 50 ml of buffer solution or deionised water through the concentrator. 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. Desalting or Solvent exchange**

The sample is first concentrated to desired level. Filtrate is discarded, then the device is refilled with an appropriate solvent. The sample is concentrated again and the process repeated until the concentration of the contaminating microsolute is sufficiently reduced. Typically three wash cycles will remove 99 % of initial salt content.

**5. 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 concentrator with a solution of 60 % Ethanol and 40 % 1M HCl. Alternatively fill concentrator with a dilute non ionic surfactant.

Place the device in filtrate bottle 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.

**6. Storage**

Following cleaning Vivacell devices may be stored for several weeks in a 20 % Ethanol solution. For best results, fill filtrate bottle with approximately 100 ml of solution, place concentrator in the bottle and then add a further 50 ml to the concentrator. This procedure will ensure that the membrane remains wetted throughout storage. Close with cap provided and preferably keep refrigerated.

**7. Chemical Compatibility**

Vivacell concentrators are designed for use with biological fluids and aqueous solutions. For chemical compatibility details refer to back page.

<b>Table 2: Technical Specifications</b>	
<b>Specifications</b>	
Concentrator capacity	10 - 70 ml
Centrifuge rotor required	62 mm cavity
Max spin speed (RCF)	1,200 x g
Max pressure	5 bar (75 psi)
Active membrane area	20 cm <sup>2</sup>
Hold-up vol. memb. & support	< 200 µl
Dead stop volume	150 µl
<b>Dimensions</b>	
Without pressure head (Ø x L)	62 x 119 mm
With centrifugal pressure head (Ø x L)	62 x 125 mm
With pressure reservoir (Ø x L)	62 x 184 mm
<b>Materials of construction</b>	
Pressure/Pressure-Fuge heads	Acetal
Quick release connector	Acetal
Concentrator cap	Santoprene
Concentrator body/sleeve	Polycarbonate
Filtrate bottle	Polycarbonate

**Table 3: Performance Characteristics**

Typical performance		Time to concentrate 30 x (minutes at 20° C)				Solute Recovery %
50ml Start Volume		In Centrifuge 1,000 g		As Pressure Cell 4 bar (60 psi) pressure		
		No Pressure	3 bar Pressure	No Agitation	Orbital Shake	
BSA 1.0 mg/ml (66,000 MW)						
5,000	MWCO PES	37	18	50	25	96 %
10,000	MWCO PES	25	15	45	20	96 %
30,000	MWCO PES	22	13	45	20	93 %
IgG 0.25 mg/ml (160,000 MW)						
50,000	MWCO PES	25	15	85	20	94 %
100,000	MWCO PES	15	11	90	18	90 %

**Table 4: Chemical Compatibility (2hr contact time)**

Solution		Solution	
Acetic Acid (25.0 %)	OK	Mercaptoethanol ( 0.1 M)	OK
Acetone (10.0 %)	NO	Methanol (60 %)	OK
Acetonitrile (10.0 %)	OK	Nitric Acid (10.0 %)	OK
Ammonium Hydroxide (5.0 %)	?	Phenol (1.0 %)	OK
Ammonium Sulphate (sat)	OK	Phosphate Buffer (1.0 M) (pH 6-8)	OK
Benzene (100 %)	NO	Polyethylene Glycol	OK
n - Butanol (70 %)	?	Pyridine	NO
Chloroform (1.0 %)	NO	Sodium Carbonate (20 %)	OK
Dimethyl Formamide (10.0 %)	NO	Sodium Deoxycholate (5.0 %)	?
Dimethyl Sulfoxide (5.0 %)	OK	Sodium Dodecylsulfate (0.1 %)	OK
Ethanol (70.0 %)	OK	Sodium Hydroxide	NO
Ethyl Acetate	NO	Sodium Hypochlorite (200 ppm)	NO
Formaldehyde (30 %)	OK	Sodium Nitrate (1.0 %)	OK
Formic Acid (5.0 %)	OK	Sulfamic Acid (3.0 %)	OK
Glycerine (70 %)	OK	Tetrahydrofuran (5.0 %)	NO
Guanidine HCl (6 M)	OK	Toluene (1.0 %)	NO
Hydrocarbons, aromatic	NO	Trichloroacetic Acid (1 %)	OK
Hydrocarbons, chlorinated	NO	Trifluoroacetic Acid (10 %)	NO
Hydrochloric Acid (1 M)	OK	Tween 20 (0.1 %)	OK
Imidazole (50 mM)	NO	Triton X-100 (0.1 %)	OK
Isopropanol (25 %)	OK	Urea (8 M)	OK
Lactic Acid (50.0 %)	OK		

OK = Acceptable ? = Questionable NO = Not recommended

<b>Ordering Information</b>		
<b>Vivacell 70 Concentrator Bodies with Polycarbonate filtrate bottles</b>		
	Pack Size	Prod. No.
5,000 MWCO PES	2	VS6011
10,000 MWCO PES	2	VS6001
30,000 MWCO PES	2	VS6021
50,000 MWCO PES	2	VS6031
100,000 MWCO PES	2	VS6041
0.2µm PES	2	VS6071
<b>Vivacell 70 Concentrator Body only</b>		
5,000 MWCO PES	10	VS6012
10,000 MWCO PES	10	VS6002
30,000 MWCO PES	10	VS6022
50,000 MWCO PES	10	VS6032
100,000 MWCO PES	10	VS6042
0.2 µm PES	10	VS6072
<b>Vivacell 70 Accessories</b>		
250 ml Centrifuge bottle - standard caps	4	VSA003
Modified caps for use in fixed angle rotors with 250 ml Centrifuge bottles	2	VCA004
Vivacell 70 Pressure-fuge head (for use in centrifuge)	2	VCA701
Replacement seals for Pressure-fuge head (VCA701)	10	VCA007
Charge valve for Pressure-Fuge head	1	VCA005
Vivacell 70 Pressure head with reservoir and filtrate bottle (bench top use)	1	VCA700
Air Pressure Controller (APC) complete with pressure gauge, regulator, over-pressure safety valve, female connector to Vivascience pressure products and 1m extension line (4 mm pneumatic tube) with male and female connectors and 6 mm tube	1	VCA002
Female connector	1	VCA010
Male connector	1	VCA011
4 mm Pneumatic tube (3 m)	1	VCA012

<b>Vivascience Technical Support</b>		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
<b>Vivascience Customer Sales</b>				
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 70

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