



## Vivaspin 500 µl and 2 ml

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

**New**

2 kDa MWCO  
Hydrosart  
in Vivaspin 2

# Vivascience Vivaspin 500 µl and 2 ml

## Storage conditions / shelf life

Vivaspin ultrafiltration spin columns should be stored at room temperature.

The devices should be used before the expiry date printed on the box.

## Introduction

Vivaspin Concentrators are disposable ultrafiltration devices for the concentration of biological samples. Maximum initial sample volumes range from 600 µl to 2 ml. They can effectively be used in either swing bucket or fixed angle rotors accepting 2.2 ml and 15 ml centrifuge tubes.

The patented vertical membrane design and thin channel filtration chamber (US 5,647,990) minimises membrane fouling and provides high speed concentrations, even with particle laden solutions.

## Vivaspin 2

The Vivaspin 2 is specifically designed with low internal surface and membrane area in order to achieve superior recoveries from very dilute solutions.

Another feature of the Vivaspin 2 is the choice of directly pipetting the concentrate from the dead stop pocket built into the bottom of the concentrator, or alternatively reverse spinning the concentrate into the recovery cap which can then be sealed for storage.

## Membrane Alternatives

In addition to the proven high flux polyethersulfone (PES) membrane range which is recommended with most solutions, Vivaspin 2 is additionally offered with regenerated cellulose (RC), cellulose triacetate (CTA) and Hydrosart®.

CTA is particularly recommended when high recovery of the filtrate solution is of primary importance. RC is sometimes more suitable for concentrating very dilute solutions and large hydrophobic proteins.



Hydrosart® is a stabilised cellulose based membrane that has been optimised for the biotechnological industry. The Hydrosart membrane is a stable polymer that features a broad pH range. Hydrosart® is also extremely hydrophilic, making it non-protein binding, virtually non-foul, and has extremely high flux. Hydrosart® is available in 5k, 10k, and 30k molecular weight cutoffs.

Please note that membrane behaviour largely depends on the specific characteristics of the solution being processed. Vivascience recommends that users experiment with alternative membranes in seeking to optimise their process performance.

## Equipment Required

1. Centrifuge with swing bucket of fixed angle (minimum 25°) rotor.

Device	Carrier Required
Vivaspin 500	2.2 ml / 11 mm Ø
Vivaspin 2	15 ml / 17 mm Ø

2. Pipettes for sample delivery and removal. For maximum recovery a thin gel loader type is recommended.

### Operation

1. Select the most appropriate membrane for your sample. For maximum recovery select a MWCO at least 50 % smaller than the molecular size of the species of interest.
2. Fill concentrator with up to maximum volumes shown in table 1. (Ensure lid is fully seated).
3. Insert assembled concentrator into centrifuge (when fixed angle rotors are used, angle concentrator so that the printed window faces upwards/outwards).
4. Centrifuge at speeds recommended in table 2, taking care not to exceed the maximum g force indicated by membrane type and MWCO.
5. Once the desired concentration is achieved, (see tables 3a & 3b for guide to concentration times), remove assembly and recover sample from the bottom of the concentrate pocket with a pipette.

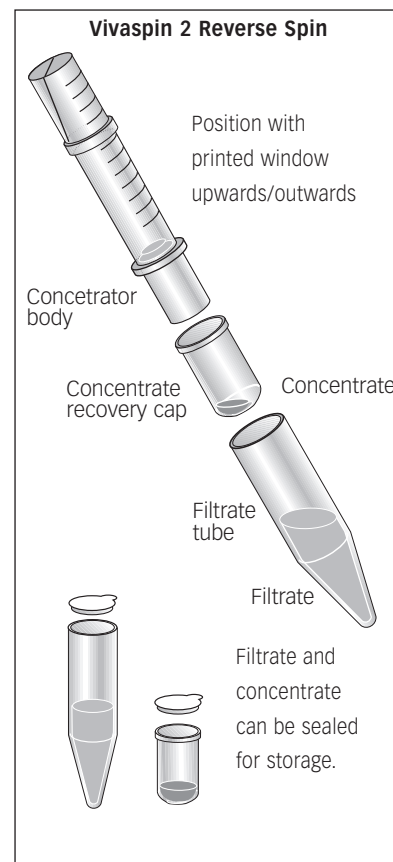
The filtrate tube can be sealed for storage.

### Reverse spin with Vivaspin 2

Depending on user preference and need for sample storage, the concentrate can be reverse spun into the concentrate recovery cap (when fixed angle rotors are used, angle concentrator so that the printed window faces upwards/outwards). In this procedure remove filtrate tube, invert the concentrator body, insert concentrate recovery cap into filtrate tube and then spin at up to 3,000 g for 2 minutes. The concentrate recovery cap can be sealed for storage.

### Desalting/Buffer Exchange

1. Concentrate sample to desired level.
2. Empty filtrate container.
3. Refill concentrator with an appropriate solvent.
4. Concentrate the sample again and repeat the process until the concentration of contaminating microsolutes is sufficiently reduced. Typically 3 wash cycles will remove 99 % of initial salt content.



Equipment required	Vivaspin 500	Vivaspin 2
Centrifuge		
Rotor type	Swing bucket or Fixed angle	Swing bucket or Fixed angle
Minimum rotor angle	40°	25°
Rotor cavity	To fit 2.2 ml (11 mm) conical bottom tubes	To fit 15 ml (17 mm) conical bottom tubes
Concentrate recovery		
Pipette type	Fixed or variable volume	Fixed or variable volume
Recommended tip	Thin gel loader type	Thin gel loader type

<b>Table 1: Technical specifications</b>	Vivaspin 500	Vivaspin 2
Concentrator capacity		
Swing bucket rotor	600 µl	3 ml
Fixed angle rotor	600 µl	2 ml
Dimensions		
Total length	50 mm	126 mm
Width	11 mm	17 mm
Active membrane area	0.5 cm <sup>2</sup>	1.2 cm <sup>2</sup>
Hold-up volume, membrane and support	< 5 µl	< 10 µl
Dead stop volume	5 µl	8 µl
Materials of construction		
Body	Polycarbonate	Polycarbonate
Filtrate vessel	Polypropylene	Polycarbonate
Concentrator cap	Polycarbonate	Polycarbonate
Membrane	Polyethersulfone	PES, CTA, RC, HY

<b>Table 2: Recommended Spin Speed (x g)</b>			
Device	VS500	VS2	
Membrane	max	Fixed angle	Swing bucket
5 - 50,000 PES	15,000	12,000	4,000
>100,000 PES	15,000	9,000	4,000
5 - 20,000 CTA	-	8,000	4,000
2 - 30,000 RC/Hydrosart	-	8,000	4,000
100,000 RC	-	8,000	4,000

## Usage Tips

### 1. Flow Rate

Filtration rate is affected by several parameters, including MWCO, porosity, sample concentration, viscosity, centrifugal force 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 Vivaspin concentrators contain trace amounts of Glycerine and Sodium azide. Should these interfere with analysis they can be removed by rinsing fill volume of buffer solution or deionised water through the concentrator. Decant filtrate and concentrate before processing sample solution.

### 3. Sterilisation of Polyethersulfone Membranes

Vivaspin devices should not be autoclaved as high temperatures will substantially increase membrane MWCO. To sterilise, use a 70 % ethanol solution or sterilising gas mixture.

### 4. Chemical Compatibility

Vivaspin concentrators are designed for use with biological fluids and aqueous solutions. For chemical compatibility details, refer to table 4.

<b>Table 3a: Typical performance VS500</b>	Time to concentrate 30x min. at 20°C	Concentrate recovery %
Start Volume	500 µl	500 µl
Aprotinin 0.25mg/ml (6,500 MW)		
3,000 MWCO PES	30	96 %
BSA 1.0 mg/ml (66,000 MW)		
5,000 MWCO PES	15	96 %
10,000 MWCO PES	5	96 %
30,000 MWCO PES	5	95 %
IgG 0.25 mg/ml (160,000 MW)		
30,000 MWCO PES	10	96 %
50,000 MWCO PES	10	96 %
100,000 MWCO PES	10	96 %

<b>Table 3b: Typical performance VS2</b>	Time to concentrate 30x min. at 20°C	Concentrate recovery %
Start volume	2 ml	2 ml
Insulin chain A 0.1mg/ml (2,535 MW)		
2,000 MWCO Hydrosart	35	95 %
Aprotinin 0.25mg/ml (6,500 MW)		
3,000 MWCO PES	50	96 %
BSA 1.0 mg/ml (66,000 MW)		
5,000 MWCO PES	12	98 %
5,000 MWCO CTA	50	96 %
5,000 MWCO Hydrosart	22	98 %
10,000 MWCO PES	8	98 %
10,000 MWCO RC	14	98 %
10,000 MWCO CTA	10	96 %
10,000 MWCO Hydrosart	12	98 %
20,000 MWCO CTA	5	96 %
30,000 MWCO PES	8	97 %
30,000 MWCO RC	5	98 %
30,000 MWCO Hydrosart	5	97 %
IgG 0.25 mg/ml (160,000 MW)		
20,000 MWCO CTA	6	97 %
30,000 MWCO PES	10	96 %
30,000 MWCO RC	9	97 %
50,000 MWCO PES	10	96 %
100,000 MWCO PES	8	95 %
100,000 MWCO RC	4	96 %

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

Solutions	PES	RC	CTA	HY	Solutions	PES	RC	CTA	HY
Compatible pH range	pH 1-9	pH 3-9	pH 4-8	pH 1-9	Compatible pH range	pH 1-9	pH 3-9	pH 4-8	pH 1-9
Acetic Acid (25.0 %)	OK	OK	NO	OK	Lactic Acid (5.0 %)	OK	OK	NO	OK
Acetone (10.0 %)	NO	NO	NO	NO	Mercaptoethanol (1.0 M)	NO	NO	NO	OK
Acetonitrile (10.0 %)	NO	NO	NO	NO	Methanol (60 %)	?	?	?	OK
Ammonium Hydroxide (5.0 %)	?	?	OK	OK	Nitric Acid (10.0 %)	OK	NO	NO	NO
Ammonium Sulphate (saturated)	OK	OK	?	?	Phenol (1.0 %)	?	?	?	NO
Benzene (100 %)	NO	NO	NO	NO	Phosphate Buffer (1.0 M)	OK	OK	OK	OK
n - Butanol (70 %)	?	?	NO	?	Polyethylene Glycol (10 %)	OK	OK	?	?
Chloroform (1.0 %)	NO	NO	NO	NO	Pyridine (100 %)	NO	NO	NO	NO
Dimethyl Formamide (10.0 %)	?	?	NO	NO	Sodium Carbonate (20 %)	OK	OK	NO	?
Dimethyl Sulfoxide (5.0 %)	OK	OK	NO	NO	Sodium Deoxycholate (5.0 %)	OK	OK	?	?
Ethanol (70.0 %)	OK	OK	OK	OK	Sodium Dodecylsulfate (0.1 M)	OK	OK	OK	OK
Ethyl Acetate (100 %)	NO	NO	NO	NO	Sodium Hydroxide (2.5 M)	NO	NO	NO	NO
Formaldehyde (30 %)	OK	OK	OK	OK	Sodium Hypochlorite (200 ppm)	OK	?	NO	NO
Formic Acid (5.0 %)	OK	OK	?	OK	Sodium Nitrate (1.0 %)	OK	OK	?	OK
Glycerine (70 %)	OK	OK	OK	OK	Sulfamic Acid (5.0 %)	OK	NO	NO	?
Guanidine HCl (6 M)	OK	OK	?	OK	Tetrahydrofuran (5.0 %)	NO	NO	NO	NO
Hydrocarbons, aromatic	NO	NO	NO	NO	Toluene (1.0 %)	NO	NO	NO	NO
Hydrocarbons, chlorinated	NO	NO	NO	NO	Trifluoroacetic Acid (10 %)	OK	NO	NO	OK
Hydrochloric Acid (1 M)	OK	NO	NO	OK	Tween 20 (0.1 %)	OK	OK	OK	OK
Imidazole (300 mM)	OK	OK	NO	?	Triton X-100 (0.1 %)	OK	OK	OK	OK
Isopropanol (70 %)	OK	OK	OK	OK	Urea (8 M)	OK	OK	?	OK

OK = Acceptable ? = Questionable NO = Not recommended

### Ordering information

Vivaspin 500 Polyethersulfone	Pack size	Prod. no.
3,000 MWCO	25	VS0191
3,000 MWCO	100	VS0192
5,000 MWCO	25	VS0111
5,000 MWCO	100	VS0112
10,000 MWCO	25	VS0101
10,000 MWCO	100	VS0102
30,000 MWCO	25	VS0121
30,000 MWCO	100	VS0122
50,000 MWCO	25	VS0131
50,000 MWCO	100	VS0132
100,000 MWCO	25	VS0141
100,000 MWCO	100	VS0142
300,000 MWCO	25	VS0151
300,000 MWCO	100	VS0152
1,000,000 MWCO	25	VS0161
1,000,000 MWCO	100	VS0162
0.2 µm	25	VS0171
0.2 µm	100	VS0172
Starter pack (5 of each 5 k, 10 k, 30 k, 50 k, 100 k)	25	VS01S1

Ordering information		
Vivaspin 2 Polyethersulfone	Pack size	Prod. no.
3,000 MWCO	25	VS0291
3,000 MWCO	100	VS0292
5,000 MWCO	25	VS0211
5,000 MWCO	100	VS0212
10,000 MWCO	25	VS0201
10,000 MWCO	100	VS0202
30,000 MWCO	25	VS0221
30,000 MWCO	100	VS0222
50,000 MWCO	25	VS0231
50,000 MWCO	100	VS0232
100,000 MWCO	25	VS0241
100,000 MWCO	100	VS0242
300,000 MWCO	25	VS0251
300,000 MWCO	100	VS0252
1,000,000 MWCO	25	VS0261
1,000,000 MWCO	100	VS0262
0.2 µm	25	VS0271
0.2 µm	100	VS0272
Starter pack (5 of each 5 k, 10 k, 30 k, 50 k, 100 k)	25	VS02S1
Vivaspin 2 Cellulose triacetate		
5,000 MWCO	25	VS02U1
5,000 MWCO	100	VS02U2
10,000 MWCO	25	VS02V1
10,000 MWCO	100	VS02V2
20,000 MWCO	25	VS02X1
20,000 MWCO	100	VS02X2
Vivaspin 2 Regenerated cellulose		
10,000 MWCO	25	VS02K1
10,000 MWCO	100	VS02K2
30,000 MWCO	25	VS02L1
30,000 MWCO	100	VS02L2
100,000 MWCO	25	VS02M1
100,000 MWCO	100	VS02M2
Vivaspin 2 Hydrosart		
2,000 MWCO	25	VS02H91
2,000 MWCO	100	VS02H92
5,000 MWCO	25	VS02H11
5,000 MWCO	100	VS02H12
10,000 MWCO	25	VS02H01
10,000 MWCO	100	VS02H02
30,000 MWCO	25	VS02H21
30,000 MWCO	100	VS02H22

### Ordering Tips

- Choose a membrane pore size at least 50% smaller than the size of the molecule to be retained.
- Usually choose Polyethersulfone membranes for fastest concentrations.
- Usually choose Cellulose Triacetate for Protein Removal/Ultrafiltrate recovery.
- Usually choose Hydrosart® membranes for highest recovery with Ig fractions.
- Usually choose Regenerated Cellulose for very dilute solutions.

## Vivascience ultrafiltration product range at a glance

Product	Sample volume	Mode	Membranes available
Vivaspin 500	100 µl - 600 µl	Centrifugal	Polyethersulfone
Vivaspin 2	0.4 ml - 2 ml	Centrifugal	Polyethersulfone, Cellulose Triacetate Regenerated Cellulose, Hydrosart®
Centrisart	0.5 ml - 2.5 ml	Centrifugal	Polyethersulfone, Cellulose Triacetate
Vivaspin 4	1 ml - 4 ml	Centrifugal	Polyethersulfone
Vivaspin 6	2 ml - 6 ml	Centrifugal	Polyethersulfone
Vivaspin 15	2 ml - 15 ml	Centrifugal	Polyethersulfone
Vivaspin 15R	2 ml - 15 ml	Centrifugal	Hydrosart®
Vivaspin 20	5 ml - 20 ml	Centrifugal Gas pressure	Polyethersulfone
Vivacell 70	10 ml - 70 ml	Centrifugal Gas pressure	Polyethersulfone
Vivacell 100	20 ml - 100 ml	Centrifugal Gas pressure	Polyethersulfone
Vivacell 250	50 ml - 250 ml	Gas pressure	Polyethersulfone
Vivaflow 50	100 ml - > 5 l	Tangential flow	Polyethersulfone, Regenerated Cellulose
Vivaflow 200	500 ml - > 5 l	Tangential flow	Polyethersulfone, Regenerated Cellulose, Hydrosart®
Vivapore 2	0.5 ml - 2.5 ml/15 ml	Solvent absorption	Polyethersulfone, Regenerated Cellulose
Vivapore 5	1 ml - 5 ml	Solvent absorption	Polyethersulfone, Regenerated Cellulose
Vivapore 10/20	2 ml - 10 ml/20 ml	Solvent absorption	Polyethersulfone, Regenerated Cellulose
Vivapore Q5	0.5 ml - 5 ml	Solvent absorption	Polyethersulfone
Vivapore Q10	1 ml - 10 ml	Solvent absorption	Polyethersulfone



### New Vivapure kits and devices now available

The development of the innovative Vivapure range continues with the launch of new protein purification kits and devices. Vivapure spin columns are currently available with metal chelate, protein A, epoxy and ion exchange membrane chemistries.

Contact us for more details or visit [www.vivascience.com](http://www.vivascience.com)

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