sartorius stedim biotech

Technical data and operating instructions

Vivaspin 500 µl and 2 ml

For in vitro use only

85030-511-58

Vivaspin Vivaspin 500 µl and 2 ml – Introduction

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. Vivaspin 500 is suitable for sample volumes of 100–500 µl and the Vivaspin 2 can handle samples up to 2 ml. Vivaspin 2 can effectively be used in either swing bucket or fixed angle rotor accepting 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 500 can be used in a benchtop fixed angle rotor, accepting 2.2 ml centrifuge tubes.

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 cellulose triacetate (CTA) and Hydrosart®.

CTA is particularly recommended when high recovery of the filtrate solution is of primary importance. 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. Sartorius Stedim Biotech 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 ∅
Vivaspin 2	15 ml/17 mm ∅

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.

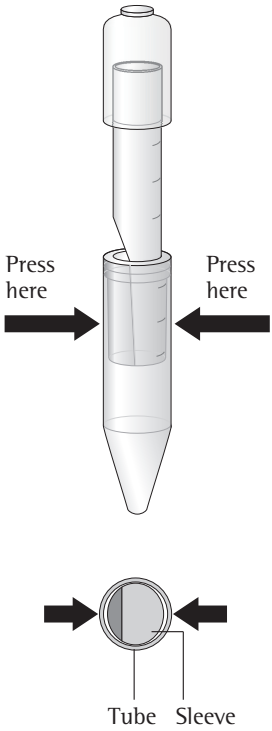
2. Fill concentrator with up to maximum volumes shown in table 1. (Ensure lid is fully seated).

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.

Removing the Vivaspin 2 body from the filtrate tube
The sleeve (seen from the end) is oval in cross section. The tube is round in cross section to give a tight fit to the sleeve. To release the tube from the sleeve, you must pinch the tube – to press it into an oval shape – before removing it with a twisting action.



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.

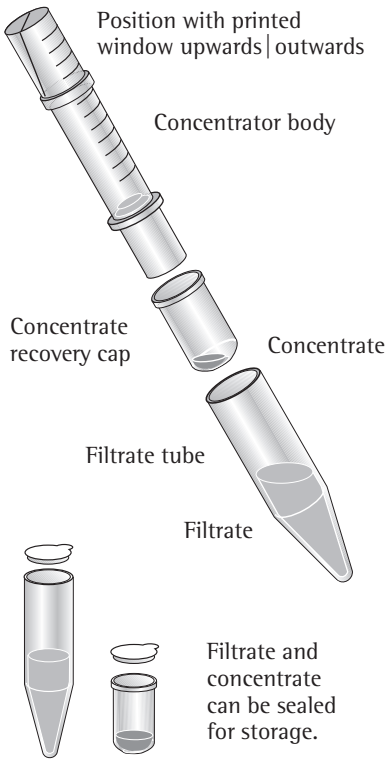
Desalting | Buffer Exchange
1. Concentrate sample to desired level.

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 microsolute is sufficiently reduced. Typically 3 wash cycles will remove 99% of initial salt content.

Vivaspin 2 Reverse Spin



Equipment required	Vivaspin 500	Vivaspin 2
Centrifuge		
Rotor type	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

Technical Specifications

Table 1: Technical specifications

	Vivaspin 500	Vivaspin 2
Concentrator capacity		
Swing bucket rotor	do not use	3 ml
Fixed angle rotor	500 µl	2 ml
Dimensions		
Total length	50 mm	126 mm
Width	11 mm	17 mm
Active membrane area	0.5 cm^2	1.2 cm^2
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, HY

Table 2: Recommended Spin Speed (x g)

Device	Vivaspin 500	Vivaspin 2	
Membrane	**Fixed angle**	**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
Hydrosart®	–	8,000	4,000

* Dead stop volume as designed in moulding tool. This volume may vary depending on sample, sample concentration, operation temperature and centrifuge rotor.

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. Pre-rinsing
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. If you do not want to use the pre-rinsed device immediately, store it in the refrigerator with buffer or water covering the membrane surface. Please do not allow the membrane to dry out.

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.

Performance Characteristics

Table 3a: Performance Characteristics Vivaspin 500

	Time to concentrate up to 30x [min.] at 20°C	Concentrate recovery %
Start volume	500 µl	500 µl
Aprotinin 0.25 mg/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%
lgG 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%

Table 3b: Performance Characteristics Vivaspin 2

	Time to concentrate up to 30x [min.] at 20°C	Concentrate recovery %
Start volume	2 ml	2 ml
Insulin chain A 0.1 mg/ml (2,535 MW)		
2,000 MWCO Hydrosart®	35	95%
Aprotinin 0.25 mg/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 CTA	10	96%
10,000 MWCO Hydrosart®	12	98%
20,000 MWCO CTA	5	96%
30,000 MWCO PES	8	97%
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%
50,000 MWCO PES	10	96%
100,000 MWCO PES	8	95%

Chemical Compatibility

Table 4: Chemical Compatibility (2hr contact time)

Solutions	PES	CTA	HY
Compatible pH range	**pH 1–9**	**pH 4–8**	**pH 1–9**
Acetic Acid (25.0%)	OK	NO	OK
Acetone (10.0%)	NO	NO	NO
Acetonitrile (10.0%)	NO	NO	NO
Ammonium Hydroxide (5.0%)	?	OK	OK
Ammonium Sulphate (saturated)	OK	?	?
Benzene (100%)	NO	NO	NO
n-Butanol (70%)	?	NO	?
Chloroform (1.0%)	NO	NO	NO
Dimethyl Formamide (10.0%)	?	NO	NO
Dimethyl Sulfoxide (5.0%)	OK	NO	NO
Ethanol (70.0%)	OK	OK	OK
Ethyl Acetate (100%)	NO	NO	NO
Formaldehyde (30%)	OK	OK	OK
Formic Acid (5.0%)	OK	?	OK
Glycerine (70%)	OK	OK	OK
Guanidine HCl (6 M)	OK	?	OK
Hydrocarbons, aromatic	NO	NO	NO
Hydrocarbons, chlorinated	NO	NO	NO
Hydrochloric Acid (1 M)	OK	NO	OK
Imidazole (300 mM)	OK	NO	?
Isopropanol (70%)	OK	OK	OK
Lactic Acid (5.0%)	OK	NO	OK
Mercaptoethanol (1.0 M)	NO	NO	OK
Methanol (60%)	?	?	OK
Nitric Acid (10.0%)	OK	NO	NO

Solutions	PES	CTA	HY
Compatible pH range	**pH 1–9**	**pH 4–8**	**pH 1–9**
Phenol (1.0%)	?	?	NO
Phosphate Buffer (1.0 M)	OK	OK	OK
Polyethylene Glycol (10%)	OK	?	?
Pyridine (100%)	NO	NO	NO
Sodium Carbonate (20%)	OK	NO	?
Sodium Deoxycholate (5.0%)	OK	?	?
Sodium Dodecylsulfate (0.1 M)	OK	OK	OK
Sodium Hydroxide (2.5 M)	NO	NO	NO
Sodium Hypochlorite (200 ppm)	OK	NO	NO
Sodium Nitrate (1.0%)	OK	?	OK
Sulfamic Acid (5.0%)	OK	NO	?
Tetrahydrofuran (5.0%)	NO	NO	NO
Toluene (1.0%)	NO	NO	NO
Trifluoroacetic Acid (10%)	OK	NO	OK
Tween 20 (0.1%)	OK	OK	OK
Triton X-100 (0.1%)	OK	OK	OK
Urea (8 M)	OK	?	OK

OK = Acceptable ? = Questionable NO = Not recommended

Ordering Information

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 lg fractions.

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

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	Pack size	Prod. no.
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 Hydrosart®	Pack size	Prod. no.
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

Other Products

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, 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
Vivapore 5	1 ml–5 ml	Solvent absorption	Polyethersulfone
Vivapore 10/20	2 ml–10 ml/20 ml	Solvent absorption	Polyethersulfone

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