



sartorius stedim
biotech

Technical data and operating instructions

Vivaspin 4 & 15 ml

For in vitro use only



85030-516-16

Vivaspin 4 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 4 ml concentrators are disposable ultrafiltration devices for the concentration of biological samples. Maximum initial sample volumes range from 1 ml to 4 ml. They can be effectively used in either swing bucket or fixed angle rotors accepting 15 ml conical bottom centrifuge tubes.

The patented vertical membrane design and thin channel filtration chamber (US 5,647,990, second patent pending) minimises membrane fouling and provides high speed concentrations, even with particle laden solutions. Vivaspin 4 is available with the high flux polyethersulfone membrane range which is recommended for most solutions.

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 volume 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 and 3b, for a 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.

Desalting | Buffer exchange

1. Concentrate sample to desired level or at least 5x.
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 microsoluble is sufficiently reduced. Typically 3 wash cycles will remove 99% of initial salt content.

Equipment required	Vivaspin 4
Centrifuge	
Rotor type	Swing bucket or Fixed angle
Minimum rotor angle	25°
Rotor cavity	To fit 15 ml (17 mm) conical bottom tubes
Concentrate recovery	
Pipette type	Fixed or variable volume
Recommended tip	Thin gel loader type

Vivaspin 15 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

The Vivaspin 15 concentrator is a disposable ultrafiltration device for use in swing bucket centrifuges accommodating 50 ml tubes. Vivaspin 15 is used for the concentration of biological samples in the 2–15 ml range. The innovative design (US Patent No. 5,647,990, second patent pending), simplicity, speed and exceptional concentrate recoveries are the main features of the concentrator.

Sample concentration

In a single spin, sample solutions can be concentrated up to 300×. Samples can be typically concentrated in 10–30 minutes with macromolecular recoveries in excess of 95%. The longitudinal membrane location and adjacent thin channel provide optimum cross flow conditions even for particle laden solutions, the centrifugal force pulling particles and solids away from the membrane to the bottom of the device. Macromolecules collect in an impermeable 50 µl concentrate pocket integrally moulded below the membrane surface, thereby eliminating the risk of filtration to dryness.

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 size of the species of interest.
 2. Fill concentrator with 2–15 ml of sample solution, taking care not to touch the membrane surface, and then close hinged lid, ensuring it is fully seated.
 3. Place concentrator in 50 ml centrifuge tube (filtrate collection vessel).
 4. Insert assembled concentrator into centrifuge and spin at up to 3000 × g. When fixed angle rotors are used, angle concentrator so that the printed window faces upwards | outwards. (See usage tips and table for guide on concentration times).
 5. Once the desired concentration is achieved, remove assembly and recover sample from the bottom of the concentrate pocket with a pipette.
- ### 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 15
Centrifuge	
Rotor type	Swing bucket or Fixed angle
Minimum rotor angle	25°
Rotor cavity	30×114 mm conical bottom tubes or 29×104 mm round bottom tubes
Concentrate recovery	
Pipette type	Fixed or variable volume
Recommended tip	Thin gel loader type

Technical Specifications

Technical specifications

	Vivaspin 4	Vivaspin 15
Concentrator capacity		
Swing bucket rotor	4 ml	15 ml
Fixed angle rotor	4 ml	8 ml
Dimensions		
Total length	122 mm	76 mm
Width	17 mm	25.5 mm
Active membrane area	2.0 cm ²	4 cm ²
Hold up volume of membrane	<10 µl	<20 µl
Dead stop volume	20 µl	50 µl
Materials of construction		
Body	Polycarbonate	Polycarbonate
Filtrate vessel	Polypropylene	Polypropylene
Concentrator cap	Polycarbonate	Polycarbonate
Membrane	Polyethersulfone	Polyethersulfone

Recommended spin speed (xg)

	Vivaspin 4		Vivaspin 15	
Membrane	Fixed angle	Swing bucket	Fixed angle	Swing bucket
5–50K PES	10,000	4,000	3,000	3,000
>100K PES	7,000	4,000	3,000	2,000

Usage Tips

4. Chemical Compatibility

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

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

Polyethersulfone membranes 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. Refer to the chemical compatibility table on this datasheet.

Performance Characteristics

Table 3a: Performance Characteristics Vivaspin 4

	Time to concentrate up to 30x [min.] at 20°C	Concentrate recovery %
Start volume	4 ml	4 ml
BSA 1.0 mg/ml (66,000 MW)		
5,000 MWCO PES	15	96%
10,000 MWCO PES	10	96%
30,000 MWCO PES	10	95%
IgG 0.25 mg/ml (160,000 MW)		
30,000 MWCO PES	10	95%
50,000 MWCO PES	10	95%
100,000 MWCO PES	10	95%

Table 3b: Performance Characteristics Vivaspin 15

	Time to concentrate up to 50x [min.] at 20°C	Concentrate recovery %
Start volume	15 ml	15 ml
BSA 1 mg/ml (66,000 MW)		
5,000 MWCO	40	97%
10,000 MWCO	25	97%
30,000 MWCO	25	96%
50,000 MWCO	25	96%
100,000 MWCO	15	70%
Cytochrome c 0.25 mg/ml (12,400 MW)		
5,000 MWCO	55	97%
10,000 MWCO	45	95%
30,000 MWCO	45	59%
50,000 MWCO	45	40%
100,000 MWCO	20	16%
IgG 0.25 mg/ml (160,000 MW)		
30,000 MWCO	30	94%
50,000 MWCO	30	94%
100,000 MWCO	30	90%
Yeast 1.0 mg/ml (<i>S. Cerevisiae</i>)		
100,000 MWCO	15	98%
0.2 µm PES	7	95%

Chemical Compatibility

Table 4: Chemical Compatibility

	Vivaspin 4	Vivaspin 15
Solutions	PES	PES
Compatible pH range	pH 1–9	pH 1–9
Acetic Acid (25.0%)	OK	OK
Acetone (10.0%)	NO	NO
Acetonitrile (10.0%)	NO	NO
Ammonium Hydroxide (5.0%)	?	?
Ammonium Sulphate (saturated)	OK	OK
Benzene (100%)	NO	NO
n-Butanol (70%)	?	?
Chloroform (1.0%)	NO	NO
Dimethyl Formamide (10.0%)	?	?
Dimethyl Sulfoxide (5.0%)	NO	NO
Ethanol (70.0%)	OK	OK
Ethyl Acetate (100%)	NO	NO
Formaldehyde (30%)	OK	OK
Formic Acid (5.0%)	OK	OK
Glycerine (70%)	OK	OK
Guanidine HCl (6 M)	OK	OK
Hydrocarbons, aromatic	NO	NO
Hydrocarbons, chlorinated	NO	NO
Hydrochloric Acid (1 M)	OK	OK
Imidazole (300 mM, max 2 hrs)	OK	OK
Isopropanol (70%)	OK	OK
Lactic Acid (5.0%)	OK	OK
Mercaptoethanol (10 mM)	OK	OK
Methanol (60%)	OK	OK
Nitric Acid (10.0%)	OK	OK
Phenol (1.0%)	NO	NO
Phosphate Buffer (1.0 M)	OK	OK
Polyethylene Glycol (10%)	OK	OK
Pyridine (100%)	NO	NO
Propanol (70%)	OK	OK
Sodium Carbonate (20%)	NO	NO
Sodium Deoxycholate (5.0%)	OK	OK
Sodium Dodecylsulfate (0.1 M)	OK	OK
Sodium Hydroxide (2.5 M)	NO	NO
Sodium Hypochlorite (200 ppm)	NO	NO
Sodium Nitrate (1.0%)	OK	OK
Sulfamic Acid (5.0%)	OK	OK
Tetrahydrofuran (5.0%)	NO	NO
Toluene (1.0%)	NO	NO
Trifluoroacetic Acid (10%)	OK	OK
Tween 20 (0.1%)	OK	OK
Triton X-100 (0.1%)	OK	OK
Urea (8 M)	OK	OK

OK = Acceptable ? = Questionable NO = Not recommended

Ordering Information

Vivaspin 4 Polyethersulfone	Pack size	Prod. no.
5,000 MWCO	25	VS0413
5,000 MWCO	100	VS0414
10,000 MWCO	25	VS0403
10,000 MWCO	100	VS0404
30,000 MWCO	25	VS0423
30,000 MWCO	100	VS0424
50,000 MWCO	25	VS0433
50,000 MWCO	100	VS0434
100,000 MWCO	25	VS0443
100,000 MWCO	100	VS0444
0.2 µm	25	VS0473
0.2 µm	100	VS0474
Starter pack (5 of each 5 k, 10 k, 30 k, 50 k, 100 k)	25	VS04S3

Vivaspin 15 Polyethersulfone	Pack size	Prod. no.
5,000 MWCO	10	VS1511
5,000 MWCO	40	VS1512
10,000 MWCO	10	VS1501
10,000 MWCO	40	VS1502
30,000 MWCO	10	VS1521
30,000 MWCO	40	VS1522
50,000 MWCO	10	VS1531
50,000 MWCO	40	VS1532
100,000 MWCO	10	VS1541
100,000 MWCO	40	VS1542
0.2 µm	10	VS1571
0.2 µm	40	VS1572
Starter pack (2 of each 5 k, 10 k, 30 k, 50 k, 100 k)	10	VS15S1

Accessories

Conical bottom 50 ml tubes and lids	100	VSA001
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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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