

Vivaspin

Vivaspin™ (Fig 1) sample concentrators are designed for fast, nondenaturing concentration of biological samples by membrane ultrafiltration. Up to 30-fold concentration of the sample can be achieved with recovery of the target molecule typically exceeding 95%. The entire process is performed in a single tube with an upper compartment containing sample and a lower compartment separated by a semipermeable membrane with a molecular weight cutoff (MWCO) selected by the user. Centrifugation is applied to force solvent through the membrane, leaving a more concentrated sample in the upper chamber.

Vivaspin sample concentrators cater for sample volumes from 100 µl to 20 ml, with a range of molecular weight cutoff values from M, 3 000 to 100 000.

Vivaspin sample concentrators offer:

- One-step sample concentration in a single tube for minimal sample handling and reduced sample loss
- Patented dead-stop technology, which ensures that samples cannot be concentrated to dryness and enables direct concentrate recovery
- Vertical polyethersulfone membrane, which minimizes membrane blockage and tolerates high flow rates
- Easy, contact-free storage by reverse spinning the concentrate into the recovery cap (Vivaspin 2)
- Compatible pH range from pH 1 to 9

Vivaspin sample concentrators are a member of the Trap platform, which addresses the need for flexible, small-scale preparation of biological samples before downstream analyses such as gel electrophoresis, liquid chromatography (LC), mass spectrometry (MS), and LC-MS.



Fig 1. From left to right: Vivaspin 500, Vivaspin 2, Vivaspin 6, and Vivaspin 20.



Choice of membranes with MWCOs from 3 000 to 100 000

Vivaspin offers a choice of membranes to cover different ultrafiltration requirements (Table 1). Concentration up to 30-fold can be achieved and typical recovery yields of concentrated samples are over 95%. For maximum recovery, select a MWCO value at least 50% smaller than the molecular size of the species of interest.

Table 1. Select the appropriate Vivaspin product from the intersection of the molecular weight cutoff value (MWCO value) and the volume range for your sample

Volume range	Product	MWCO value					
		3 000	5 000	10 000	30 000	50 000	100 000
100–500 µl	Vivaspin 500	28-9322-18	28-9322-23	28-9322-25	28-9322-35	28-9322-36	28-9322-37
400 µl to 2 ml	Vivaspin 2	28-9322-40	28-9322-45	28-9322-47	28-9322-48	28-9322-57	28-9322-58
2–6 ml	Vivaspin 6	28-9322-93	28-9322-94	28-9322-96	28-9323-17	28-9323-18	28-9323-19
5–20 ml	Vivaspin 20	28-9323-58	28-9323-59	28-9323-60	28-9323-61	28-9323-62	28-9323-63

Features

Vivaspin 500

Vivaspin 500 can be used in a benchtop fixed angle rotor that accepts 2.2 ml centrifuge tubes.

Vivaspin 2

Vivaspin 2 can be used in either a swing bucket or a fixed angle rotor accepting 15 ml centrifuge tubes.

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

Vivaspin 2 offers the choice of either 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 of the sample.

Vivaspin 6

Vivaspin 6 can be used in either a swing bucket or a fixed angle rotor accepting 15 ml centrifuge tubes.

Vivaspin 6 features twin vertical membranes for higher processing speed.

Vivaspin 20

Vivaspin 20 features twin vertical membranes for higher processing speed.

Characteristics

Table 2. Characteristics of Vivaspin sample concentrators

Membrane	Polyethersulfone (PES)			
Body	Polycarbonate			
Filtrate vessel	Polycarbonate			
Vivaspin	500	2	6	20
Concentrator capacity, swing bucket rotor	Do not use	3 ml	6 ml	20 ml
Concentrator capacity, fixed angle rotor	500 µl	2 ml	6 ml	14 ml
Length	50 mm	126 mm	122 mm	116 mm
Width	11 mm	17 mm	17 mm	30 mm
Active membrane area	0.5 cm ²	1.2 cm ²	2.5 cm ²	6.0 cm ²
Hold-up volume of membrane	< 5 µl	< 10 µl	< 10 µl	< 20 µl
Dead-stop volume	5 µl	8 µl	30 µl	50 µl

Performance characteristics

Vivaspin 500

Table 3. Performance characteristics of Vivaspin 500

Protein Filter		Up to 30-fold sample concentration ¹	Recovery
Aprotinin 0.25 mg/ml (M_r = 6 500)			
MWCO 3 000		30 min	96%
BSA 1.0 mg/ml (M_r = 66 000)			
MWCO 5 000		15 min	96%
MWCO 10 000		5 min	96%
MWCO 30 000		5 min	95%
IgG 0.25 mg/ml (M_r = 160 000)			
MWCO 30 000		10 min	96%
MWCO 50 000		10 min	96%
MWCO 100 000		10 min	96%

¹ Centrifugation time to achieve an up to 30-fold sample concentration with a start volume of 500 µl at 20°C (fixed angle 25° rotor)

Vivaspin 6

Table 5. Performance characteristics of Vivaspin 6

Protein Filter	Up to 30-fold sample concentration ¹			
	Swing bucket rotor	Recovery	25° Fixed angle rotor	Recovery
Cytochrome C 0.25 mg/ml (M_r = 12 400)				
MWCO 3 000	-	-	90 min	97%
BSA 1.0 mg/ml (M_r = 66 000)				
MWCO 5 000	20 min	98%	12 min	98%
MWCO 10 000	13 min	98%	10 min	98%
MWCO 30 000	12 min	98%	9 min	97%
IgG 0.25 mg/ml (M_r = 160 000)				
MWCO 30 000	18 min	96%	15 min	95%
MWCO 50 000	17 min	96%	14 min	95%
MWCO 100 000	15 min	91%	12 min	91%

¹ Centrifugation time to achieve an up to 30-fold sample concentration with a start volume of 6 ml at 20°C.

Vivaspin 2

Table 4. Performance characteristics of Vivaspin 2

Protein Filter		Up to 30-fold sample concentration ¹	Recovery
Aprotinin 0.25 mg/ml (M_r = 6 500)			
MWCO 3 000		50 min	96%
BSA 1.0 mg/ml (M_r = 66 000)			
MWCO 5 000		12 min	98%
MWCO 10 000		8 min	98%
MWCO 30 000		8 min	97%
IgG 0.25 mg/ml (M_r = 160 000)			
MWCO 30 000		10 min	96%
MWCO 50 000		10 min	96%
MWCO 100 000		8 min	95%

¹ Centrifugation time to achieve an up to 30-fold sample concentration with a start volume of 2 ml at 20°C (fixed angle 25° rotor)

Vivaspin 20

Table 6. Performance characteristics of Vivaspin 20

Protein Filter	Up to 30-fold sample concentration ¹			
	Swing bucket rotor	Recovery	25° Fixed angle rotor	Recovery
Cytochrome C 0.25 mg/ml (M_r = 12 400)				
MWCO 3 000	110 min	97%	180 min	96%
BSA 1.0 mg/ml (M_r = 66 000)				
MWCO 5 000	23 min	99%	29 min	99%
MWCO 10 000	16 min	98%	17 min	98%
MWCO 30 000	13 min	98%	15 min	98%
IgG 0.25 mg/ml (M_r = 160 000)				
MWCO 30 000	27 min	97%	20 min	95%
MWCO 50 000	27 min	96%	22 min	95%
MWCO 100 000	25 min	91%	20 min	90%

¹ Centrifugation time to achieve an up to 30-fold sample concentration with a start volume of 20 ml (swing bucket rotor) or 14 ml (fixed angle 25° rotor) at 20°C.

Chemical compatibility

Vivaspin concentrators are designed for use with biological fluids and aqueous solutions. Compatible pH range is from pH 1 to 9. For chemical compatibility, see Table 7.

Table 7. Vivaspin chemical compatibility (2 h contact time)

Solution	Compatibility ¹	Solution	Compatibility ¹
Acetic acid (25%)	Yes	Lactic acid (5%)	Yes
Acetone (10%)	No	Mercaptoethanol (1 M)	No
Acetonitrile (10%)	No	Nitric acid (10%)	Yes
Ammonium sulfate (saturated)	Yes	Phosphate buffer (1 M)	Yes
Benzene (100%)	No	Polyethylene glycol (10%)	Yes
Chloroform (1%)	No	Pyridine (100%)	No
Dimethyl sulfoxide (5%)	Yes	Sodium carbonate (20%)	Yes
Ethanol (70%)	Yes	Sodium deoxycholate (5%)	Yes
Ethyl acetate (100%)	No	Sodium dodecylsulfate (0.1 M)	Yes
Formaldehyde (30%)	Yes	Sodium hydroxide (2.5 M)	No
Formic acid (5%)	Yes	Sodium hypochlorite (200 ppm)	Yes
Glycerine (70%)	Yes	Sodium nitrate (1%)	Yes
Guanidine HCl (6 M)	Yes	Sulfamic acid (5%)	Yes
Hydrocarbons, aromatic	No	Tetrahydrofuran (5%)	No
Hydrocarbons, chlorinated	No	Toluene (1%)	No
Hydrochloric acid (1 M)	Yes	Trifluoroacetic acid (10%)	Yes
Imidazole (300 mM)	Yes	Tween™ 20 (0.1%)	Yes
Isopropanol (70%)	Yes	Triton™ X-100 (0.1%)	Yes
		Urea (8 M)	Yes

¹ Yes indicates chemical compatibility and No indicates chemical incompatibility and that the solution is not recommended

Ordering information

Product	Pack size	Code No.
Vivaspin 500 MWCO 3 000	25	28-9322-18
Vivaspin 500 MWCO 5 000	25	28-9322-23
Vivaspin 500 MWCO 10 000	25	28-9322-25
Vivaspin 500 MWCO 30 000	25	28-9322-35
Vivaspin 500 MWCO 50 000	25	28-9322-36
Vivaspin 500 MWCO 100 000	25	28-9322-37
Vivaspin 2 MWCO 3 000	25	28-9322-40
Vivaspin 2 MWCO 5 000	25	28-9322-45
Vivaspin 2 MWCO 10 000	25	28-9322-47
Vivaspin 2 MWCO 30 000	25	28-9322-48
Vivaspin 2 MWCO 50 000	25	28-9322-57
Vivaspin 2 MWCO 100 000	25	28-9322-58
Vivaspin 6 MWCO 3 000	25	28-9322-93
Vivaspin 6 MWCO 5 000	25	28-9322-94
Vivaspin 6 MWCO 10 000	25	28-9322-96
Vivaspin 6 MWCO 30 000	25	28-9323-17
Vivaspin 6 MWCO 50 000	25	28-9323-18
Vivaspin 6 MWCO 100 000	25	28-9323-19
Vivaspin 20 MWCO 3 000	12	28-9323-58
Vivaspin 20 MWCO 5 000	12	28-9323-59
Vivaspin 20 MWCO 10 000	12	28-9323-60
Vivaspin 20 MWCO 30 000	12	28-9323-61
Vivaspin 20 MWCO 50 000	12	28-9323-62
Vivaspin 20 MWCO 100 000	12	28-9323-63

Related product	Pack size	Code No.
PD-10 Desalting Columns	30	17-0851-01
PD SpinTrap™ G-25	50	28-9180-04
PD MultiTrap™ G-25	4 × 96-well filter plates	28-9180-06
PD MiniTrap™ G-25	50	28-9180-07
PD MidiTrap™ G-25	50	28-9180-08
PD MiniTrap G-10	50	28-9180-10
PD MidiTrap G-10	50	28-9180-11

For contact information for your local office, please visit www.gelifesciences.com/contact

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Vivaspin is a trademark of Sartorius Stedim Biotech GmbH.

This product is covered by US patent No. 5,647,990, second patent pending, and their equivalents in other countries.

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