

Vivaspin™ sample concentrators

SAMPLE CONCENTRATION

Vivaspin™ sample concentrators (Fig 1) are designed for fast, nondenaturing concentration of biological samples using membrane ultrafiltration. You can achieve up to 30-fold concentration of your sample with around 95% target molecule recovery. The sample concentrator performs the entire process 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) you select. Centrifugation is applied to force solvent through the membrane, leaving a more concentrated sample in the upper chamber.

Vivaspin™ sample concentrators work with sample volumes from 100 µL to 20 mL, with a range of molecular weight cutoff values from M_r 3000 to 100 000.

Vivaspin™ sample concentrator features:

- 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 3000 to 100 000

Vivaspin™ sample concentrators work with a range of membranes to cover your ultrafiltration requirements (Table 1). You can concentrate up to 30-fold with over 95% recovery yields. 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 MWCO value and the volume range for your sample.

Volume range	Product	MWCO value					
		3000	5000	10 000	30 000	50 000	100 000
100–500 µL	Vivaspin™ 500	28932218	28932223	28932225	28932235	28932236	28932237
400 µL to 2 mL	Vivaspin™ 2	28932240	28932245	28932247	28932248	28932257	28932258
2–6 mL	Vivaspin™ 6	28932293	28932294	28932296	28932317	28932318	28932319
5–20 mL	Vivaspin™ 20	28932358	28932359	28932360	28932361	28932362	28932363

Features

Vivaspin™ 500

You can use Vivaspin™ 500 in a benchtop fixed angle rotor that accepts 2.2 mL centrifuge tubes.

Vivaspin™ 2

You can use Vivaspin™ 2 in 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 to achieve superior recoveries from very diluted 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 reverse spinning the concentrate into the recovery cap, which you can then seal to store the sample.

Vivaspin™ 6

You can use Vivaspin™ 6 in 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	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 = 6500)		
MWCO 3000	30 min	96%
BSA 1.0 mg/mL (M_r = 66 000)		
MWCO 5000	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 3000	-	-	90 min	97%
BSA 1.0 mg/mL (M_r = 66 000)				
MWCO 5000	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 = 6500)		
MWCO 3000	50 min	96%
BSA 1.0 mg/mL (M_r = 66 000)		
MWCO 5000	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 3000	110 min	97%	180 min	96%
BSA 1.0 mg/mL (M_r = 66 000)				
MWCO 5000	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 deoxycholate (0.1 M)	Yes
Formaldehyde (30%)	Yes	Sodium hydroxide (2.5 M)	No
Formic acid (5%)	Yes	Sodium hydroxide (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	Product code
Vivaspin™ 500	MWCO	3 000 25	28932218
Vivaspin™ 500	MWCO	5 000 25	28932223
Vivaspin™ 500	MWCO	10 000 25	28932225
Vivaspin™ 500	MWCO	30 000 25	28932235
Vivaspin™ 500	MWCO	50 000 25	28932236
Vivaspin™ 500	MWCO	100 000 25	28932237
Vivaspin™ 2	MWCO	3 000 25	28932240
Vivaspin™ 2	MWCO	5 000 25	28932245
Vivaspin™ 2	MWCO	10 000 25	28932247
Vivaspin™ 2	MWCO	30 000 25	28932248
Vivaspin™ 2	MWCO	50 000 25	28932257
Vivaspin™ 2	MWCO	100 000 25	28932258
Vivaspin™ 6	MWCO	3 000 25	28932293
Vivaspin™ 6	MWCO	5 000 25	28932294
Vivaspin™ 6	MWCO	10 000 25	28932296
Vivaspin™ 6	MWCO	30 000 25	28932317
Vivaspin™ 6	MWCO	50 000 25	28932318
Vivaspin™ 6	MWCO	100 000 25	28932319
Vivaspin™ 20	MWCO	3 000 12	28932358
Vivaspin™ 20	MWCO	5 000 12	28932359
Vivaspin™ 20	MWCO	10 000 12	28932360
Vivaspin™ 20	MWCO	30 000 12	28932361
Vivaspin™ 20	MWCO	50 000 12	28932362
Vivaspin™ 20	MWCO	100 000 12	28932363

Related products	Pack size	Product code
PD-10 Desalting Columns	30	17085101
PD SpinTrap™ G-25	50	28918004
PD MultiTrap™ G-25	4 × 96-well filter plates	28918006
PD MiniTrap™ G-25	50	28918007
PD MidiTrap™ G-25	50	28918008
PD MiniTrap™ G-10	50	28918010
PD MidiTrap™ G-10	50	28918011

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

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