# Vivaspin<sup>™</sup> 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<sup>™</sup> sample concentrators work with sample volumes from 100 µL to 20 mL, with a range of molecular weight cutoff values from M<sub>2</sub> 3000 to 100 000.

Vivaspin<sup>™</sup> 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.

#### **MWCO** value Volume range **Product** 3000 5000 10 000 30 000 50000 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 Vivaspin™ 6 2-6 mL 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 $^{\text{TM}}$  2 is specifically designed with low internal surface and membrane areas to achieve superior recoveries from very diluted solutions.

Vivaspin<sup>™</sup> 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 <sup>2</sup>	1.2 cm <sup>2</sup>	2.5 cm <sup>2</sup>	6.0 cm <sup>2</sup>
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<sup>™</sup> 500

<b>Protein</b> Filter		Up to 30-fold sample concentration <sup>1</sup>	Recovery	
Aprotin (M <sub>r</sub> = 65	in 0.25 mg/mL 00)			
MWCO 3	3000	30 min	96%	
BSA 1.0 (M <sub>r</sub> = 66	•			
MWCO	5000	15 min	96%	
MWCO	10 000	5 min	96%	
MWCO	30 000	5 min	95%	
IgG 0.25 (M <sub>r</sub> = 16	5 mg/mL 0 000)			
MWCO	30 000	10 min	96%	
MWCO	50 000	10 min	96%	
MWCO	100 000	10 min	96%	

 $<sup>^1</sup>$  Centrifugation time to achieve an up to 30-fold sample concentration with a start volume of 500  $\mu L$  at 20  $^\circ C$  (fixed angle 25  $^\circ$  rotor).

#### Vivaspin™ 6

**Table 5.** Performance characteristics of Vivaspin<sup>™</sup> 6

		Up to 30-fold sample concentration <sup>1</sup>			
<b>Protein</b> Filter		Swing bucket rotor	Recovery	25° Fixed angle rotor	Recovery
Cytochi 0.25 mg (M <sub>r</sub> = 12	/mL				-
MWCO 3	3000	-	_	90 min	97%
BSA 1.0 (M <sub>r</sub> = 66	•				
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 0.29 (M <sub>r</sub> = 16	5 mg/mL 0 000)				
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%

 $<sup>^{1}</sup>$ 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

<b>Protein</b> Filter		Up to 30-fold sample concentration <sup>1</sup>	Recovery
Aprotin (M <sub>r</sub> = 65	in 0.25 mg/mL 00)		
MWCO	3000	50 min	96%
BSA 1.0 (M <sub>r</sub> = 66	•		
MWCO	5000	12 min	98%
MWCO	10 000	8 min	98%
MWCO	30 000	8 min	97%
IgG 0.25 (M <sub>r</sub> = 16	5 mg/mL 0 000)		
MWCO	30 000	10 min	96%
MWCO	50 000	10 min	96%
MWCO	100 000	8 min	95%

 $<sup>^1</sup>$  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

		Up to 30-fold sample concentration <sup>1</sup>			
Protein		Swing bucket		25° Fixed	
Filter		rotor	Recovery	angle rotor	Recovery
Cytochr 0.25 mg (M <sub>r</sub> = 12	/mL				
MWCO	3000	110 min	97%	180 min	96%
BSA 1.0 (M <sub>r</sub> = 66					
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 (M <sub>r</sub> = 16	•				
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%

 $<sup>^1</sup>$  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<sup>™</sup> 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	Compatib	ility <sup>1</sup>	Solution Compa	tibility <sup>1</sup>
Acetic acid (25	%)	Yes	Lactic acid (5%)	Yes
Acetone (10%)		No	Mercaptoethanol (1 M)	No
Acetonitrile (10	)%)	No	Nitric acid (10%)	Yes
Ammonium sul (saturated)	fate	Yes	Phosphate buffer (1 M)	Yes
Benzene (100%	ó)	No	Polyethylene glycol (10%)	Yes
Chloroform (19	6)	No	Pyridine (100%)	No
Dimethyl sulfor	xide (5%)	Yes	Sodium carbonate (20%)	Yes
Ethanol (70%)		Yes	Sodium deoxycholate (5%)	Yes
Ethyl acetate (1	00%)	No	Sodium deoxycholate (0.1 M)	Yes
Formaldehyde (	30%)	Yes	Sodium hydroxide (2.5 M)	No
Formic acid (59	%)	Yes	Sodium hydroxide (200 ppm)	Yes
Glycerine (70%	o)	Yes	Sodium nitrate (1%)	Yes
Guanidine HCI	(6 M)	Yes	Sulfamic acid (5%)	Yes
Hydrocarbons,	aromatic	No	Tetrahydrofuran (5%)	No
Hydrocarbons,	chlorinated	No	Toluene (1%)	No
Hydrochloric a	cid (1 M)	Yes	Trifluoroacetic acid (10%)	Yes
Imidazole (300	mM)	Yes	Tween™ 20 (0.1%)	Yes
Isopropanol (70	D%)	Yes	Triton™ X-100 (0.1%)	Yes
			Urea (8 M)	Yes

 $<sup>^{\</sup>rm 1}$  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 si	ze I	Product code
PD-10 Desalting Columns	30		17085101
PD SpinTrap™ G-25	50		28918004
PD MultiTrap™ G-25	4 × 96-well filter plate	es	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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