SARTORIUS

Product Datasheet



Vivaspin®

Comprehensive Solutions for Centrifugal and Pressurized Sample Concentration

DOMINIQUE DUTSCHER SAS

Benefits

- High speed ultrafiltration
- Maximum target molecule recoveries
- Highest concentration factors
- Broadest choice of MWCO and capacity
- Gentle processing of sensitive samples

Product Information

The original Vivaspin® centrifugal concentrators combine high process speeds with unique choices of membrane materials, MWCOs, sample capacities and process control methods, to suit all target molecule types. Developed by scientists behind the now ubiquitous vertical membrane orientation, these devices are designed for optimal performance, while minimizing membrane polarization and fouling.

Product Information

The Vivaspin® product family is a comprehensive range of centrifugal concentrators, with eight devices suited to most sample types, volumes, and applications. In a single device, it is possible to achieve the highest concentration factors, while eliminating the risk of concentrating samples to dryness. Benefit from high process speeds when concentrating or re-buffering any target molecule, with the convenience of easy-to-use centrifugal devices.

Vivaspin® 500 enables fast concentration of 0.1 – 0.5 mL sample volumes to as little as 5 µL.

Vivaspin® 2 is specially designed with a low internal surface and membrane area, and choice of three membrane types, to ensure superior recoveries. In addition, these devices are reverse spin enabled, for pipette-free concentrate retrieval.

Vivaspin® 6 has a unique capacity, ensuring efficiency when processing 2 - 6 mL samples, without the need to use a larger device. Dual vertical membranes and a low volume dead-stop pocket enable high process speeds and maximum concentration factors.

Vivaspin® 15R features Hydrosart® regenerated cellulose (RC) membranes, which have been optimized for the biopharmaceutical industry to provide high flux, minimal fouling, and low target molecule adsorption. Convenient scale-up is possible, with Hydrosart® regenerated cellulose (RC) membranes also available in the Vivaflow® range.

Vivaspin® 20 is recommended for initial samples in the 5 – 20 mL range. Complimentary equipment and accessories are also available for continuous diafiltration or ultrafiltration under positive pressure.

Vivaspin® 100 has the highest capacity of any centrifugal ultrafiltration device, for easy and convenient handling of larger sample volumes. Furthermore, pressurization is available as an alternative process method.

Vivaspin® Endotest is certified pyrogen free and features a 20 kDa MWCO cellulose triacetate (CTA) membrane, which has been specially selected for the concentration of endotoxin and removal of interfering substances from samples prior to LAL testing

Applications

Vivaspin® concentrators suit most ultrafiltration and diafiltration applications for samples in the 0.1 – 98 mL range, including:

- Concentration, desalting and buffer exchange of proteins, enzymes, nucleic acids, monoclonal antibodies, immunoglobulins, extracellular vesicles, viruses and nanoparticles
- HPLC sample preparation
- Recovery of biomolecules from cell culture supernatants or lysates
- Cell washing, virus purification and cell debris removal
- Environmental sample clarification or concentration

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Vivaspin® 500, 2, 6, 15R | Endotest, 20 and 100

Technical Specifications

	Vivaspin® 500	Vivaspin® 2	Vivaspin® 6
Dimensions			
Sample capacity	0.1 – 0.5 mL	0.4 – 3 mL	2 – 6 mL
Dimensions (L | D)	50 | 11 mm	126 | 17 mm	122 | 17 mm
Active membrane area	0.5 cm^2	1.2 cm^2	2.5 cm^2
Dead-stop volume	5 µL	8 µL	30 µL
Hold-up volume	< 5 µL	< 10 µL	< 10 µL
Materials of Construction			
Body	Polycarbonate (PC)	Polycarbonate (PC)	Polycarbonate (PC)
Filtrate vessel	Polypropylene (PP)	Polycarbonate (PC)	Polycarbonate (PC)
Concentrator cap	Polycarbonate (PC)	Polycarbonate (PC)	Polypropylene (PP)
Membrane	Polyethersulfone (PES)	Polyethersulfone (PES) Hydrosart® (RC) Cellulose triacetate (CTA)	Polyethersulfone (PES)

	Vivaspin® 15R | Endotest	Vivaspin® 20	Vivaspin® 100
Dimensions			
Sample capacity	2 – 15 mL	5 - 20 mL	20 - 98 mL
Dimensions (L | D)	116 | 30 mm	116 | 30 mm 125 | 30 mm w/ pressure head	123 | 62 mm 197 | 62 mm w/ pressure head
Active membrane area	3.9 cm^2	6.0 cm^2	23.5 cm^2
Dead-stop volume	30 µL	50 µL	350 µL
Hold-up volume	< 20 µL	< 20 µL	< 250 µL
Materials of Construction			
Body	Polycarbonate (PC)	Polycarbonate (PC)	Polycarbonate (PC)
Filtrate vessel	Polycarbonate (PC)	Polycarbonate (PC)	Polycarbonate (PC)
Concentrator cap	Polypropylene (PP)	Polypropylene (PP)	Polypropylene (PP)
Membrane	Hydrosart® (RC) Cellulose triacetate (CTA)	Polyethersulfone (PES)	Polyethersulfone (PES)

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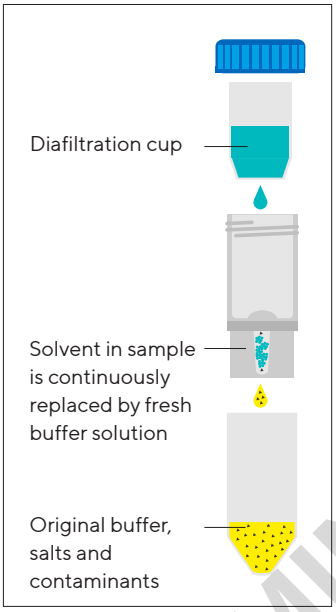
Alternative Process Methods

Continuous Diafiltration
In this procedure, a specially designed diafiltration cup inserted into the concentrator body of Vivaspin® 20 is filled with buffer and centrifuged once to achieve 98% salt removal. This compares to the need for two centrifugation steps to achieve the same result with the discontinuous (re-fill and re-spin) diafiltration method.

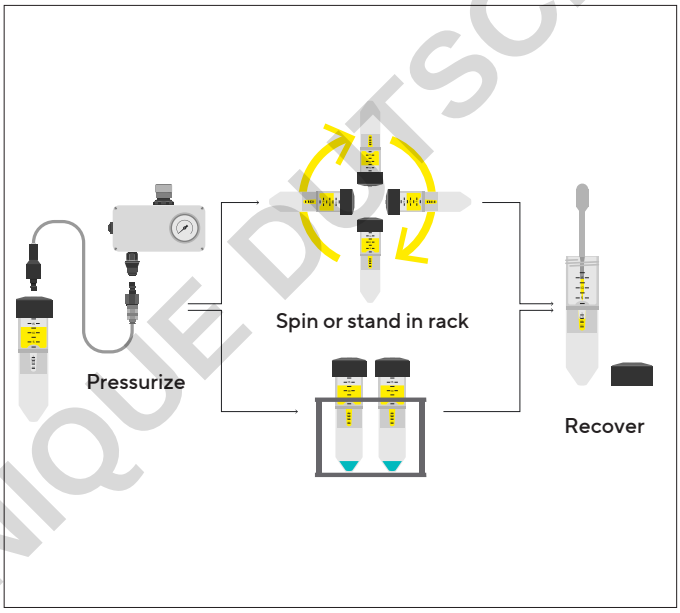
The improved performance is due to the constant washing action of the exchange buffer from the diafiltration cup, as it replaces the original solvent and salts when they pass through the ultrafiltration membrane.

Pressurized Ultrafiltration
When an appropriate centrifuge is unavailable, or for single sample processing, Vivaspin® 20 and 100 centrifugal concentrators may be pressurized with compressed gas for bench-top concentration. This process method is also ideal for sensitive samples, due to consistent transmembrane pressures.

For even faster processing of samples in Vivaspin® 20, gas pressure can be combined with centrifugal force. This pressure-fugation method is particularly suitable for difficult to filter or viscous samples, such as serum, or when using low process temperatures, which reduce filtration speed, and generally when minimum process time is essential. In a similar way, Vivaspin® 100 may be pressurized and placed on an orbital shaker for faster processing.



Vivaspin® 20 continuous diafiltration



Vivaspin® 20 pressurized operation

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Performance

Performance Characteristics for Vivaspin® 500		
	Time to concentrate up to 30x at 20°C and solute recovery	
Rotor	Fixed angle	
Centrifugal force	12,000 *g*	
Start volume	0.5 mL	
	Time	**Recovery**
Aprotonin 0.25 mg/mL (6.5 kDa)		
3 kDa MWCO PES	30 min	96%
BSA 1.0 mg/mL (66 kDa)		
5 kDa MWCO PES	15 min	96%
10 kDa MWCO PES	5 min	96%
30 kDa MWCO PES	5 min	95%
IgG 0.25 mg/mL (160 kDa)		
30 kDa MWCO PES	10 min	96%
50 kDa MWCO PES	10 min	96%
100 kDa MWCO PES	10 min	96%

Performance Characteristics for Vivaspin® 2		
	Time to concentrate up to 30x at 20°C and solute recovery	
Rotor	Fixed angle	
Centrifugal force	5,000 *g*	
Start volume	2 mL	
	Time	**Recovery**
Insulin chain A 0.1 mg/mL (2.5 kDa)		
2 kDa MWCO RC	35 min	95%
Aprotonin 0.25 mg/mL (6.5 kDa)		
3 kDa MWCO PES	50 min	96%
BSA 1.0 mg/mL (66 kDa)		
5 kDa MWCO PES	12 min	98%
5 kDa MWCO RC	22 min	98%
10 kDa MWCO PES	8 min	98%
10 kDa MWCO RC	12 min	98%
10 kDa MWCO CTA	10 min	96%
20 kDa MWCO CTA	5 min	96%
30 kDa MWCO PES	8 min	97%
30 kDa MWCO RC	5 min	97%
IgG 0.25 mg/mL (160 kDa)		
20 kDa MWCO CTA	6 min	97%
30 kDa MWCO PES	10 min	96%
50 kDa MWCO PES	10 min	96%
100 kDa MWCO PES	8 min	95%

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Performance Characteristics for Vivaspin® 6

	Time to concentrate up to 30x at 20°C and solute recovery			
Rotor	Swing bucket		Fixed angle (25°)	
Centrifugal force	3,000 *g*		7,500 *g*[1]	
Start volume	6 mL		6 mL	
	Time	**Recovery**	**Time**	**Recovery**
Cytochrome c 0.25 mg/mL (12.4 kDa)				
3 kDa MWCO PES	-	-	90 min	97%
BSA 1.0 mg/mL (66 kDa)				
5 kDa MWCO PES	20 min	98%	12 min	98%
10 kDa MWCO PES	13 min	98%	10 min	98%
30 kDa MWCO PES	12 min	98%	9 min	97%
IgG 0.25 mg/mL (160 kDa)				
30 kDa MWCO PES	18 min	96%	15 min	95%
50 kDa MWCO PES	17 min	96%	14 min	95%
100 kDa MWCO PES	15 min	91%	12 min	91%
Latex beads 0.004% (55 nm)				
300 kDa MWCO PES	-	-	25 min	99%
Latex beads 0.004% (240 nm)				
1,000 kDa MWCO PES	-	-	4 min	99%
Yeast 1.0 mg/mL (*S. cerevisiae*)				
0.2 µm PES	4 min	97%	3 min	97%

[1] 6,000 *g* relative centrifugal force for devices with 100, 300 and 1,000 kDa MWCO or 0.2 µm pore size membranes.

Performance Characteristics for Vivaspin® 15R

	Time to concentrate up to 30x at 20°C and solute recovery			
Rotor	Swing bucket		Fixed angle (25°)	
Centrifugal force	3,000 *g*		6,000 *g*	
Start volume	15 mL		12.5 mL	
	Time	**Recovery**	**Time**	**Recovery**
Insulin chain A 0.1 mg/mL (2.5 kDa)				
2 kDa MWCO RC	70 min	96%	60 min	96%
Aprotonin 0.1 mg/mL (6.5 kDa)				
5 kDa MWCO RC	47 min	95%	45 min	95%
Cytochrome c 0.25 mg/mL (12.4 kDa)				
5 kDa MWCO RC	45 min	96%	45 min	96%
10 kDa MWCO RC	25 min	94%	18 min	94%
Alpha chymotrypsin 0.25 mg/mL (25 kDa)				
5 kDa MWCO RC	50 min	98%	45 min	98%
10 kDa MWCO RC	25 min	98%	18 min	98%
Ovalbumin 1.0 mg/mL (45 kDa)				
10 kDa MWCO RC	20 min	98%	14 min	98%
30 kDa MWCO RC	15 min	94%	12 min	94%
BSA 1.0 mg/mL (66 kDa)				
30 kDa MWCO RC	18 min	98%	15 min	98%
IgG 0.1 mg/mL (160 kDa)				
30 kDa MWCO RC	30 min	98%	25 min	96%

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Performance Characteristics for Vivaspin® 20 (Centrifugation)				
	Time to concentrate up to 30x at 20°C and solute recovery			
Rotor	Swing bucket		Fixed angle (25°)	
Centrifugal force	3,000 *g*		6,000 *g*	
Start volume	20 mL		14 mL	
	Time	**Recovery**	**Time**	**Recovery**
Cytochrome c 0.25 mg/mL (12.4 kDa)				
3 kDa MWCO PES	110 min	97%	180 min	96%
BSA 1.0 mg/mL (66 kDa)				
5 kDa MWCO PES	23 min	99%	29 min	99%
10 kDa MWCO PES	16 min	98%	17 min	98%
30 kDa MWCO PES	13 min	98%	15 min	98%
IgG 0.25 mg/mL (160 kDa)				
30 kDa MWCO PES	27 min	97%	20 min	95%
50 kDa MWCO PES	27 min	96%	22 min	95%
100 kDa MWCO PES	25 min	91%	20 min	90%
Latex beads 0.004% (55 nm)				
300 kDa MWCO PES	20 min	99%	35 min	99%
Latex beads 0.004% (240 nm)				
1,000 kDa MWCO PES	4 min	99%	12 min	99%
Yeast 1.0 mg/mL (*S. cerevisiae*)				
0.2 µm PES	15 min	95%	5 min	95%

Performance Characteristics for Vivaspin® 20 (Pressurization)				
	Time to concentrate up to 30x at 20°C and solute recovery			
Mode	Pressure		Pressure-fuge	
Pressure	4 bar [2]		4 bar [2]	
Rotor	-		Swing bucket	
Centrifugal force	-		3,000 *g* [3]	
Start volume	10 mL		10 mL	96%
	Time	**Recovery**	**Time**	**Recovery**
Cytochrome c 0.25 mg/mL (12.4 kDa)				
3 kDa MWCO PES	60 min	96%	-	-
BSA 1.0 mg/mL (66 kDa)				
5 kDa MWCO PES	50 min	98%	14 min	98%
10 kDa MWCO PES	32 min	97%	8 min	97%
30 kDa MWCO PES	32 min	97%	8 min	97%
IgG 0.25 mg/mL (160 kDa)				
30 kDa MWCO PES	46 min	94%	13 min	97%
50 kDa MWCO PES	46 min	93%	13 min	96%
100 kDa MWCO PES	42 min	88%	12 min	94%
Latex beads 0.004% (55 nm)				
300 kDa MWCO PES	10 min	99%	-	-
Latex beads 0.004% (240 nm)				
1,000 kDa MWCO PES	4 min	99%	-	-
Yeast 1.0 mg/mL (*S. cerevisiae*)				
0.2 µm PES	20 min	95%	2 min	95%

[2] 2 bar operating pressure for devices with 100, 300 and 1,000 kDa MWCO or 0.2 µm pore size membranes.
[3] 2,000 *g* relative centrifugal force for devices with 100, 300 and 1,000 kDa MWCO or 0.2 µm pore size membranes.

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Performance Characteristics for Vivaspin® 100

	Time to concentrate up to 30x at 20°C and solute recovery					
Mode	Centrifuge		Pressure		Pressure-shake	
Pressure	-		4 bar [4]		4 bar [4]	
Rotor	Swing Bucket		-		-	
Centrifugal force	2,000 *g*		-		-	
Start volume	90 mL		90 mL		90 mL	
	Time	**Recovery**	**Time**	**Recovery**	**Time**	**Recovery**
BSA 1.0 mg/mL (66 kDa)						
5 kDa MWCO PES	22 min	96%	75 min	96%	25 min	96%
10 kDa MWCO PES	16 min	96%	60 min	96%	20 min	96%
30 kDa MWCO PES	16 min	94%	60 min	94%	20 min	94%
IgG 0.25 mg/mL (160 kDa)						
50 kDa MWCO PES	20 min	94%	70 min	94%	30 min	94%
100 kDa MWCO PES	20 min	90%	85 min	90%	30 min	90%
Latex beads 0.004% (55 nm)						
300 kDa MWCO PES	35 min	99%	-	-	120 min	99%
Latex beads 0.004% (240 nm)						
1,000 kDa MWCO PES	4 min	99%	5 min	99%	4 min	99%

[4] 2 bar operating pressure for devices with 100, 300 and 1,000 kDa MWCO membranes.

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Ordering Information

Vivaspin®	500[1]	2[1]	6[1]	15R | Endotest[2]	20[2]	100[3]
PES MWCO						
3 kDa	VS0191 VS0192	VS0291 VS0292	VS0691 VS0692		VS2091 VS2092	
5 kDa	VS0111 VS0112	VS0211 VS0212	VS0611 VS0612		VS2011 VS2012	VC1011 VC1012
10 kDa	VS0101 VS0102	VS0201 VS0202	VS0601 VS0602		VS2001 VS2002	VC1001 VC1002
30 kDa	VS0121 VS0122	VS0221 VS0222	VS0621 VS0622		VS2021 VS2022	VC1021 VC1022
50 kDa	VS0131 VS0132	VS0231 VS0232	VS0631 VS0632		VS2031 VS2032	VC1031 VC1032
100 kDa	VS0141 VS0142	VS0241 VS0242	VS0641 VS0642		VS2041 VS2042	VC1041 VC1042
300 kDa	VS0151 VS0152		VS0651 VS0652		VS2051 VS2052	VC1051 VC1052
1,000 kDa	VS0161 VS0162		VS0661 VS0662		VS2061 VS2062	VC1061 VC1062
0.2 µm	VS0172		VS0672		VS2072	VC1072
RC MWCO						
2 kDa		VS02H91 VS02H92		VS15RH91 VS15RH92		
5 kDa		VS02H11 VS02H12		VS15RH11 VS15RH12		
10 kDa		VS02H01 VS02H02		VS15RH01 VS15RH02		
30 kDa		VS02H21 VS02H22		VS15RH21 VS15RH22		
CTA MWCO						
10 kDa		VS02V2				
20 kDa		VS02X2		VS15RXETO		

Pack sizes of: [1] 25 | 100 pieces; [2] 12 | 48 pieces; or [3] 2 | 10 pieces

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Vivaspin® Equipment and Accessories		
Continuous Diafiltration	**Quantity**	**Order No.**
Vivaspin® 20 diafiltration cups	12	VSA005
Pressurized Ultrafiltration		
Air pressure controller (APC) fitted with pressure gauge, regulator, over-pressure safety valve and female coupling. APC is supplied with extension line (4 mm pneumatic tubing, 1 m) with male and female couplings, and inlet tubing (6 mm pneumatic tubing, 1 m)	1	VCA002
Replacement female coupling	1	VCA010
Replacement male coupling	1	VCA011
Replacement extension line (4 mm pneumatic tubing, 3 m)	1	VCA012
Charge valve for pressure head VCA200	1	VCA005
Vivaspin® 20 pressure head	1	VCA200
Vivaspin® 100 pressure head	1	VCA800

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