SARTORIUS

Product Datasheet

Vivacon® 500 and Vivacon® 2

For Safe DNA and Protein Concentration or Re-buffering



DOMINIQUE DUTSCHER SAS

Benefits

- Highest recoveries for linear molecules and low concentration samples
- Sterile and DNA-free devices available for reliable forensic analysis
- Complete retentate recovery without the need for pipetting

Product Overview

Vivacon®, in comparison to the classical Vivaspin® centrifugal ultrafiltration devices, features a horizontal membrane design that is optimized for high recoveries of linear molecules, such as DNA, and samples with very low initial concentrations. PCR Grade versions are ethylene oxide (EtO) treated and therefore especially recommended in critical applications, such as the concentration of samples for forensic analysis.

For the ultimate in convenience, each unit is printed with the membrane MWCO and both Vivacon® 500 and 2 devices are reverse-spin enabled for complete recoveries of the retentate samples.

Product Information

Highest DNA recoveries
For optimal performance with very dilute samples, e.g. genomic DNA for forensic applications, Vivacon® 500 and 2 are equipped with the patented regenerated cellulose membrane, Hydrosart®, that guarantees extremely low binding properties and high flux. High recoveries and excellent reproducibility are paired with convenience offered by the MWCO printed on individual devices. The horizontal membrane design is also preferred by some users for reasons of consistency with previously used procedures.

Safe DNA concentration
Selected MWCOs in Vivacon® are also available in PCR Grade versions, which are sterile and DNA-free. For this, they have been treated with a validated, dual-cycle ethylene oxide (EtO) gas treatment process to a safety assurance level (SAL) of 10^{-6}. They are also free of detectable human genomic DNA, tested in a qPCR assay over 55 cycles with a verified limit of detection < 2 pg. This high safety level makes Vivacon® 500 and 2 PCR Grade the products of choice for most critical applications, such as case work in the forensic industry.

Complete sample recovery
The option of a reverse-spin step after sample processing assures complete and highly reproducible concentrate recovery. This is especially important when working with low sample concentrations.

Applications
- DNA re-buffering of organic extraction samples before sequencing reaction in e.g. forensic case work
- Dye removal after sequencing reaction
- Primer removal after PCR
- Plasmid concentration
- Protein concentration | re-buffering
- Filter Aided Sample Preparation (FASP)

Summary
For scientists and lab technicians who need to reliably and safely concentrate, re-buffer or fractionate dilute DNA samples after organic extraction or PCR, Sartorius offers the Vivacon® 500 and 2 centrifugal devices. Unlike alternative ultrafiltration units, Vivacon® 500 and 2 are also available in PCR Grade versions. This is especially important in forensic casework, enabling completely reliable results with the highest sample recoveries.



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Technical Specifications

	Vivacon® 500	Vivacon® 2
Concentrator capacity		
Fixed angle rotor	0.5 mL	2 mL
Dimensions		
Total length, concentration	45 mm	125 mm
Total length, reverse spin	47.5 mm	115 mm
Diameter	12.4 mm	16 mm
Active membrane area	0.32 cm^2	0.95 mm^2
Hold-up volume, membrane and support	< 5 µL	10 µL
Dead-stop volume	5 µL (40° rotor)	55 µL (25° rotor)

Equipment required

	Vivacon® 500	Vivacon® 2
Centrifuge		
Rotor type	Fixed angle	Fixed angle
Minimum rotor angle	40°	25°
Rotor cavity	To fit 1.5 | 2.2 mL (11 mm) conical bottom tubes	To fit 15 mL (17 mm) conical bottom tubes
Maximum speed	14,000 *g**	7,500 *g**
Materials of construction		
Body	Polycarbonate	
Filtrate vessel	Polypropylene	
Membrane	Hydrosart®	

[1] Please note that some membrane cut offs need to be processed at lower g forces. See Operation Instructions for details.

References for DNA concentration | re-buffering for forensic case work:

1. Performance evaluation of the Vivacon® 2 mL in comparison to the Centricon® 100 and evaluation of the ability and reliability of the TECAN Freedom EVO® 150 automated liquid-handling workstation in plate set up for quantification and amplification as part of a system wide validation by Arzate-Abdelfattah, Helvia, M.S., UNIVERSITY OF NORTH TEXAS HEALTH SCIENCE CENTER AT FORT WORTH, 2009, 58 pages; 1474530
2. Franchia et al. (2011). DNA typing strategy to overcome post-mortem bone maceration. Proceedings of the 24th International ISFG Congress 3(1): e367–e368.
3. Weitza et al. (2009). DNA profiling of skeletal samples from the disappeared in Latin America. Proceedings of the 23rd International ISFG Congress 2(1): 245–247.

References for FASP:

1. Wisniewski, Zougman, Nagaraj and Mann (2009). Universal sample preparation method for proteome analysis. Nature Methods 6(5): 359–362.
2. Wisniewski, Zielinska and Mann (2010). Comparison of ultrafiltration units for proteomic and N-glycoproteomic analysis by the filter-aided sample preparation method. Analytical Biochemistry 410 (2): 307–309.
3. Matic et *al.* (2011). Absolute SILAC-Compatible Expression Strain Allows Sumo-2 Copy Number Determination in Clinical Samples. Journal of Proteome Research 10 (10): 4869–4875.

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Performance Characteristics

DNA concentration with Vivacon® 500

Time to concentrate up to 30x at 20 °C and solute recovery		
Rotor	Fixed angle	
	7,500 *g* (2–10 kDa MWCO) 5,000 *g* (30–50 kDa MWCO) 3,000 *g* (≥ 100 kDa MWCO)[1]	
Start volume	0.5 mL	Concentrate recovery %
	Time	Recovery
DNA, 50 ng/mL (10 bp) 2 kDa MWCO	60 min	93%
DNA, 50 ng/mL (30 bp) 10 kDa MWCO	25 min	94%
DNA, 50 ng/mL (50 bp) 30 kDa MWCO	18 min	88%
DNA, 50 ng/mL (300 bp) 50 kDa MWCO	18 min	91%
DNA, 50 ng/mL (600 bp) 100 kDa MWCO	10 min	87%
DNA, 50 ng/mL (650 bp) 125 kDa MWCO	12 min	85%
DNA, 50 ng/mL (900 bp) 125 kDa MWCO	9 min	94%

[1] For 125 kDa MWCO with 650 bp DNA, centrifugal force was 2,000 *g*

DNA concentration with Vivacon® 2

Time to concentrate up to 30x at 20 °C and solute recovery		
Rotor	Fixed angle	
	7,500 *g* (2 kDa MWCO) 5,000 *g* (10 kDa MWCO) 2,500 *g* (≥ 30 kDa MWCO)	
Start volume	2 mL	
	Time	Recovery
DNA, 50 ng/mL (10 bp) 2 kDa MWCO	120 min	92%
DNA, 50 ng/mL (30 bp) 10 kDa MWCO	60 min	94%
DNA, 50 ng/mL (50 bp) 30 kDa MWCO	60 min	95%
DNA, 50 ng/mL (300 bp) 50 kDa MWCO	45 min	96%
DNA, 50 ng/mL (600 bp) 100 kDa MWCO	30 min	93%
DNA, 50 ng/mL (650 bp) 125 kDa MWCO	30 min	88%
DNA, 50 ng/mL (900 bp) 125 kDa MWCO	30 min	89%

Protein concentration with Vivacon® 500

Time to concentrate up to 30x at 20 °C and solute recovery		
Rotor	Fixed angle	
Centrifugal force	14,000 *g* (2–50 kDa MWCO) 8,000 *g* (≥ 100 kDa MWCO	
Start volume	0.5 mL	Concentrate recovery %
	Time	Recovery
Cytochrome c, 0.25 mg/mL (12.4 kDa)		
2 kDa MWCO	30 min	95%
10 kDa MWCO	15 min	92%
BSA, 1 mg/mL (66 kDa)		
30 kDa MWCO	10 min	95%
50 kDa MWCO	10 min	92%
Bovine IgG, 1 mg/mL (160 kDa)		
100 kDa MWCO	11 min	90%
125 kDa MWCO	10 min	81%

DNA concentration with Vivacon® 2

Time to concentrate up to 30x at 20 °C and solute recovery		
Rotor	Fixed angle	
Centrifugal force	7,500 *g* (2 kDa MWCO) 5,000 *g* (≥ 10 kDa MWCO)	
Start volume	2 mL	
	Time	Recovery
Cytochrome c, 0.25 mg/mL (12.4 kDa)		
2 kDa MWCO	120 min	95%
10 kDa MWCO	90 min	96%
BSA, 1 mg/mL (66 kDa)		
30 kDa MWCO	40 min	96%
50 kDa MWCO	30 min	94%
Bovine IgG, 1 mg/mL (160 kDa)		
100 kDa MWCO	30 min	92%
125 kDa MWCO	27 min	81%

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Conversion Table for MWCO to Nucleotide Cut-Off

Membrane	MWCO	Double-Stranded Nucleotide Cut-Off
Hydrosart®	2 kDa	> 10 bp
Hydrosart®	10 kDa	> 30 bp
Hydrosart®	30 kDa	> 50 bp
Hydrosart®	50 kDa	> 300 bp
Hydrosart®	100 kDa	> 600 bp
Cellulose Triacetate	125 kDa	> 650 bp

Ordering Information

Vivacon® 500	Qty.	Order No.
2 kDa MWCO	25	VN01H91
2 kDa MWCO	100	VN01H92
10 kDa MWCO	25	VN01H01
10 kDa MWCO	100	VN01H02
30 kDa MWCO	25	VN01H21
30 kDa MWCO	100	VN01H22
30 kDa MWCO	**100**	**VN01H22ETO**
50 kDa MWCO	25	VN01H31
50 kDa MWCO	100	VN01H32
100 kDa MWCO	25	VN01H41
100 kDa MWCO	100	VN01H42
100 kDa MWCO	**100**	**VN01H42ETO**
125 kDa MWCO	100	VN01H82

Vivacon® 2	Qty.	Order No.
2 kDa MWCO	100	VN02H92
10 kDa MWCO	100	VN02H02
30 kDa MWCO	100	VN02H22
50 kDa MWCO	100	VN02H32
100 kDa MWCO	100	VN02H42
100 kDa MWCO	**100**	**VN02H42ETO**
125 kDa MWCO	100	VN02H82

PCR optimized
Highlighted Vivacon® devices are the products of choice for critical applications as they are sterile (SAL 10^{-6}) and DNA-free (< 2 pg). The 100 kDa MWCO membrane is optimally suited for concentrating DNA for case work e.g. in the forensic industry. This larger MWCO allows contaminant PCR inhibitors like indigo dyes to permeate the membrane.

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