



Vivacon[®] 500 and Vivacon[®] 2

For safe DNA and protein concentration and rebuffing from 500 µl to 2 ml starting volumes.



■ Sterile and DNA-free devices available

■ Highest DNA recoveries with Hydrosart[®] membranes

■ Complete sample recovery with reverse spinning

Disposable devices for DNA concentration and buffer exchange

Working Principle

Centrifugation provides the vector to clear solvent and micro molecules through an ultrafiltration membrane to separate macromolecular species and solvents primarily on the basis of size. It is particularly appropriate for the concentration of DNA and proteins and can also be used to rebuffer samples. Ultrafiltration is a non denaturing method that is more efficient, flexible and gentle than alternative processes.

Vivacon[®], in comparison to the classical Vivaspin[®] units, features a horizontal membrane design that is optimized for consistency with previously used procedures.

Safe DNA concentration

Selected cut offs of the Vivacon[®] units are also available in PCR Grade, meaning sterile and DNA-free. For this, they have been treated with a validated, dual-cycle ethylene oxide (ETO) gas 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 Vivacon[®] 2 PCR Grade the products of choice for most critical applications, like e.g. case work in the forensic industry.

Highest DNA recoveries

For optimal performance with very dilute samples, e.g. genomic DNA for forensic applications, Vivacon[®] 500 and Vivacon[®] 2 are equipped with the patented Hydrosart[®] regenerated cellulose membrane that guarantees extremely low binding properties and high flux. High recoveries and excellent reproducibility are paired with convenience offered by the molecular weight cut-off printed on individual devices. Vivacon[®], in comparison to the classical Vivaspin units, features a horizontal membrane design that is preferred by some users for reasons of consistency with previously used procedures.

Complete sample recovery

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

Applications

- DNA rebuffing of organic extraction samples before sequencing reaction for e.g. forensic case work
- Dye removal after sequencing reaction
- Primer removal after PCR reaction
- Plasmid concentration
- Protein concentration
- Protein rebuffing
- Peptide fractionation (FASP)

Summary

For scientists and lab technicians who need to reliably and safely concentrate, rebuffer or fractionate dilute DNA samples after organic extraction or PCR reactions, Sartorius offers the Vivacon[®] 500 and 2 centrifugal devices.

Unlike competitive ultrafiltration units, Vivacon[®] 500 and 2 are additionally available in PCR Grade, meaning sterile and DNA free. This is especially important in forensic case work and enables completely reliable results at highest sample recoveries.

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 (Back-spin) | 47.5 mm | 115 mm |
| Width | 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

Centrifuge

| | Fixed angle | Fixed angle |
|---------------------|--|-------------|
| 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 | |
| Maximum speed | 14,000 g* | 7,500 g* |

Materials of construction

| | |
|-----------------|---------------|
| Body | Polycarbonate |
| Filtrate vessel | Polypropylene |
| Membrane | Hydrosart® |

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

References for DNA concentration | rebuffering for forensic case work:

1. Performance evaluation of the Vivacon(RTM) 2 ml in comparison to the Centricon(RTM) 100 and evaluation of the ability and reliability of the TECAN Freedom EVO(RTM) 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
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a Reparto Carabinieri Investigazioni Scientifiche di Roma, Sezione di Biologia, Rome, Italy
b Dipartimento di Biologia Evoluzionistica, Laboratori di Antropologia, Università di Firenze, Via del Proconsolo 12, 50122 Florence, Italy. Progress in Forensic Genetics 14 – Proceedings of the 24th International ISFG Congress, Volume 3, Issue 1, December 2011, Pages e367–e368
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Steven Weitz, Lisa A. Riccia, Jon Davorena, Carlos Vullob, Mercedes Saladoc, Fredy Peccerellid; a Bode Technology, 10430 Furnace Road, Suite 107, Lorton, VA, United States; b LIDMO, Independencia 644- 4to A, 5000 Córdoba, Argentina; c Equipo Argentino de Antropología Forense (EAAF), Rivadavia 2443, 2do piso, Buenos Aires, (1034) Argentina; d Fundación de Antropología Forense de Guatemala (FAFG), Primera Calle 1-53, Colonia el Sauce, Zona 2, Guatemala City, Guatemala
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References for FASP:

1. Wisniewski JR, Zougman A, Nagaraj N, Mann M. Universal sample preparation method for proteome analysis (2009). Nat Methods. 6(5):359-62.
2. Jacek R. Wisniewski, Dorota F. Zielinska and Matthias Mann (2010). Anal Biochem Dec 14, 2010
3. Ivan Matic, Ellis G. Jaffray, Senga K. Oxenham, Michael J. Groves, Christopher Barratt, Sudhir Tauro, Nicola R. Stanley-Wall, and Ron Hay J. Proteome Res., Just Accepted Manuscript – DOI: 10.1021/pr2004715 – Publication Date (Web): 11 August 2011

Performance Characteristics

DNA concentration with Vivacon® 500

Start volume 0.5 ml, sample concentration 50 ng/ml DNA

| | Sample size (bp) | Time to concentrate up to 30x [min.] at 20°C | Concentrate recovery % | RCF (× g) |
|--------------|------------------|--|------------------------|-----------|
| 2,000 MWCO | 10 | 60 min | 93 % | 7,500 |
| 10,000 MWCO | 30 | 25 min | 94 % | 7,500 |
| 30,000 MWCO | 50 | 18 min | 88 % | 5,000 |
| 50,000 MWCO | 300 | 18 min | 91 % | 5,000 |
| 100,000 MWCO | 600 | 10 min | 87 % | 3,000 |
| 125,000 MWCO | 650 | 10 min | 79 % | 1,000 |
| 125,000 MWCO | 900 | 9 min | 94.8 % | 3,000 |

DNA concentration with Vivacon® 2

Start volume 2 ml, sample concentration 50 ng/ml DNA

| | Sample size (bp) | Time to concentrate up to 30x [min.] at 20°C | Concentrate recovery % | RCF (× g) |
|--------------|------------------|--|------------------------|-----------|
| 2,000 MWCO | 10 | 120 min | 92 % | 7,500 |
| 10,000 MWCO | 30 | 60 min | 94 % | 5,000 |
| 30,000 MWCO | 50 | 60 min | 95 % | 2,500 |
| 50,000 MWCO | 300 | 45 min | 96 % | 2,500 |
| 100,000 MWCO | 600 | 30 min | 93 % | 2,500 |
| 125,000 MWCO | 650 | 30 min | 85 % | 2,000 |
| 125,000 MWCO | 900 | 30 min | 88.7 % | 2,500 |

Protein concentration with Vivacon® 500

Start volume 0.5 ml, sample and concentration of proteins as specified in table

| | Sample | Time to concentrate up to 30x [min.] at 20°C | Concentrate recovery % | RCF (× g) |
|--------------|-------------------------|--|------------------------|-----------|
| 2,000 MWCO | 0.25 mg/ml cytochrome c | 30 min | 95% | 14,000 |
| 10,000 MWCO | 0.25 mg/ml cytochrome c | 15 min | 92 % | 14,000 |
| 30,000 MWCO | 1.0 mg/ml BSA | 10 min | 95 % | 14,000 |
| 50,000 MWCO | 1.0 mg/ml BSA | 10 min | 92 % | 14,000 |
| 100,000 MWCO | 1.0 mg/ml bovine IgG | 11 min | 90 % | 8,000 |
| 125,000 MWCO | 1.0 mg/ml bovine IgG | 10 min | 81 % | 8,000 |

Protein concentration with Vivacon® 2

Start volume 2 ml, sample and concentration of proteins as specified in table

| | Sample | Time to concentrate up to 30x [min.] at 20°C | Concentrate recovery % | RCF (× g) |
|--------------|-------------------------|--|------------------------|-----------|
| 2,000 MWCO | 0.25 mg/ml cytochrome c | 120 min | 95 % | 7,500 |
| 10,000 MWCO | 0.25 mg/ml cytochrome c | 90 min | 96 % | 5,000 |
| 30,000 MWCO | 1.0 mg/ml BSA | 40 min | 96 % | 5,000 |
| 50,000 MWCO | 1.0 mg/ml BSA | 30 min | 94 % | 5,000 |
| 100,000 MWCO | 1.0 mg/ml bovine IgG | 30 min | 92 % | 5,000 |
| 125,000 MWCO | 1.0 mg/ml bovine IgG | 27 min | 81 % | 5,000 |

Conversion Table for Hydrosart® MWCO to Nucleotide Cut-off

| Membrane | MWCO | Double-Stranded Nucleotide Cut-off (bp) |
|------------|---------|---|
| Hydrosart® | 2 kDa | > 10 |
| Hydrosart® | 10 kDa | > 30 |
| Hydrosart® | 30 kDa | > 50 |
| Hydrosart® | 50 kDa | > 300 |
| Hydrosart® | 100 kDa | > 600 |
| Hydrosart® | 125 kDa | > 650 |

Ordering Information

| Vivacon® 500 | Qty. per box | Prod. No. |
|---------------------|--------------|-------------------|
| 2,000 MWCO | 25 | VN01H91 |
| 2,000 MWCO | 100 | VN01H92 |
| 10,000 MWCO | 25 | VN01H01 |
| 10,000 MWCO | 100 | VN01H02 |
| 30,000 MWCO | 25 | VN01H21 |
| 30,000 MWCO | 100 | VN01H22 |
| 30,000 MWCO | 25 | VN01H21ETO |
| 30,000 MWCO | 100 | VN01H22ETO |
| 30,000 MWCO | 500 | VN01H23ETO |
| 50,000 MWCO | 25 | VN01H31 |
| 50,000 MWCO | 100 | VN01H32 |
| 100,000 MWCO | 25 | VN01H41 |
| 100,000 MWCO | 100 | VN01H42 |
| 100,000 MWCO | 25 | VN01H41ETO |
| 100,000 MWCO | 100 | VN01H42ETO |
| 100,000 MWCO | 500 | VN01H43ETO |
| 125,000 MWCO | 25 | VN01H81 |
| 125,000 MWCO | 100 | VN01H82 |
| 125,000 MWCO | 500 | VN01H83 |
| 125,000 MWCO | 25 | VN01H81ETO |
| 125,000 MWCO | 100 | VN01H82ETO |
| 125,000 MWCO | 500 | VN01H83ETO |

PCR optimized

Highlighted Vivacons® are the products of choice for most critical applications as they are sterile (SAL 10⁻⁶) and DNA-free (< 2 pg). The new 125 kDa MWCO membrane is optimally suited for concentrating DNA for case work e.g. in the forensic industry. This larger cut off allows PCR inhibitors like indigo dyes contaminating the sample to pass the membrane.

Ordering Information

| Sample Kits | Qty. per box | Prod. No. |
|---|--------------|-----------|
| Sample Kit L (4 units each of 2, 10, 30 kDa) | 12 | VN01HL12 |
| Sample Kit H (4 units each of 30, 50, 100 kDa) | 12 | VN01HH12 |

| Vivacon® 2 | Qty. per box | Prod. No. |
|---------------------|--------------|-------------------|
| 2,000 MWCO | 25 | VN02H91 |
| 2,000 MWCO | 100 | VN02H92 |
| 10,000 MWCO | 25 | VN02H01 |
| 10,000 MWCO | 100 | VN02H02 |
| 30,000 MWCO | 25 | VN02H21 |
| 30,000 MWCO | 100 | VN02H22 |
| 30,000 MWCO | 25 | VN02H21ETO |
| 30,000 MWCO | 100 | VN02H22ETO |
| 30,000 MWCO | 500 | VN02H23ETO |
| 50,000 MWCO | 25 | VN02H31 |
| 50,000 MWCO | 100 | VN02H32 |
| 100,000 MWCO | 25 | VN02H41 |
| 100,000 MWCO | 100 | VN02H42 |
| 100,000 MWCO | 25 | VN02H41ETO |
| 100,000 MWCO | 100 | VN02H42ETO |
| 100,000 MWCO | 500 | VN02H43ETO |
| 125,000 MWCO | 25 | VN02H81 |
| 125,000 MWCO | 100 | VN02H82 |
| 125,000 MWCO | 500 | VN02H83 |
| 125,000 MWCO | 25 | VN02H81ETO |
| 125,000 MWCO | 100 | VN02H82ETO |
| 125,000 MWCO | 500 | VN02H83ETO |

Sartorius Stedim Biotech GmbH
August-Spindler-Strasse 11
37079 Goettingen, Germany

Phone +49.551.308.0
Fax +49.551.308.3289
www.sartorius-stedim.com

USA Toll-Free +1.800.368.7178
UK +44.1372.737159
France +33.442.845600
Italy +39.055.63.40.41
Spain +34.90.2110935
Russian Federation +7.812.6100821
Japan +81.3.3740.5407

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