Bangs Laboratories, Inc.
BEADS ABOVE THE REST

Vivaspin® 2mL Ultrafiltration Device

Product Data Sheet AA022

DESCRIPTION

Vivaspin® Concentrators are disposable ultrafiltration devices that may be utilized for the washing and concentration of submicron (20 nm - 0.5 µm) microspheres.

Vivaspin® 2 can effectively be used in either swing bucket or fixed angle rotor centrifuges accepting 15 mL tubes.The patented vertical membrane design and thin channel filtration chamber (US 5,647,990) minimizes membrane fouling and provides high speed concentrations, even with particle laden solutions. The proven high flux polyethersulfone (PES) membrane range is recommended with most solutions *(see Table 2 for chemical compatibility)*.

APPLICATIONS

The Vivaspin® 2 is specifically designed with low internal surface and membrane area in order to achieve superior recoveries from very dilute solutions. Another feature of the Vivaspin® 2 is the choice of directly pipetting the concentrate from the dead stop pocket built into the bottom of the concentrator, or alternatively reverse spinning the concentrate into the recovery cap which can then be sealed with paraffin film for short-term storage.

EQUIPMENT REQUIRED

1. Centrifuge with swing bucket or fixed angle (minimum 25°) rotor (carrier required: 15 mL/17mm in diameter)
2. Pipettes for sample delivery and removal. For maximum recovery a thin gel loader type is recommended.

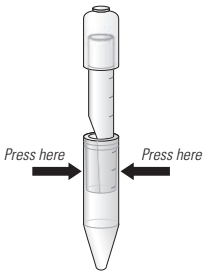
Technical Specifications - Table 1

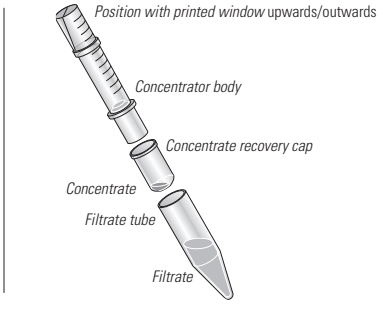
Concentrator capacity	
Swing bucket rotor	3 mL
Fixed angle rotor	2 mL
Dimensions	
Total length	126 mm
Width	17 mm
Active membrane area	1.2 cm^2
Hold-up volume membrane and support	<10 µL
Dead stop volume	8 µL
Materials of construction	
Body	Polycarbonate
Filtrate vessel	Polycarbonate
Concentrator cap	Polycarbonate
Membrane	PES

* Dead stop volume as designed in moulding tool. This volume may vary depending on sample, sample concentration, operation temperature and centrifuge rotor.

PROCEDURE

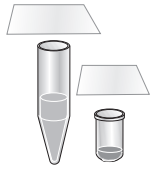
1. This Vivaspin® 2mL device features a 300,000 MWCO Polyethersulfone (PES) membrane. It is suitable for retaining particles 20nm+.
2. Fill concentrator body with up to maximum volumes in Table 1. (Ensure lid is fully seated). The microsphere sample may be diluted prior to loading.
   Notes - Removing the Vivaspin® 2 body from the filtrate tube
   a. The base of the concentrator body (seen from the end) is oval in cross section. The filtrate tube is round in cross section to give a tight fit to the concentrator body. To release the tube from the concentrator body, you must pinch the tube (see right) – before removing it with a twisting action.
   b. After each round of centrifugation, the device may be bath sonicated briefly (~30 seconds) to deter sticking of the particles to the membrane. (see also #3, usage tips)
3. Insert assembled concentrator into centrifuge (when fixed angle rotors are used, angle concentrator so that the printed window faces upwards/outwards).
4. Centrifuge at 4,500 - 9,000 × G for 5-10 minutes (or 4000 × G for 5-10 minutes for swing bucket rotors). While the exact force required will vary, and should be optimized, the aim is to concentrate the particle - containing fraction, but not form a pellet. For example, one wash might begin with 2 mL suspension, and concentrate to 0.2 mL.
5. Filtrate may be discarded or decanted from the base of the device.
6. Repeat washes by adding more buffer to the concentrator body, and then centrifuging, and decating filtrate. Typically three wash cycles are conducted. After each separation, the assembled device may be held in a sonicator briefly (30 sec.) Care should be taken to ensure that water from the bath sonicator is not introduced into the device.
7. Pipet concentrate from the dead stop pocket in the bottom of the concentrator. It is also possible to reverse spin the device to maximize recovery (see reverse spin instructions).





REVERSE SPIN WITH VIVASPIN® 2

Depending on user preference and need for sample storage, the concentrate can be reverse spun into the concentrate recovery cap (when fixed angle rotors are used, angle concentrator so that the printed window faces upwards/outwards). In this procedure remove filtrate tube, invert the concentrator body, insert concentrate recovery cap into filtrate tube and then spin at up to 3,000 ×G for 2 minutes. The concentrate recovery cap can be sealed with paraffin film for short-term storage. (see right)



Filtrate and concentrate can be sealed with paraffin film for storage.

Usage Tips

1. *Flow Rate* - Filtration rate is affected by several parameters, including MWCO, porosity, sample concentration, viscosity, centrifugal force and temperature. Expect significantly longer spin times for starting solutions with over 5% solids. When operating at 4°C, flow rates are approximately 1.5 times slower than at 25°C. Viscous solutions such as 50% glycerine will take up to 5 times longer to concentrate than samples in a predominantly buffer solution.
2. *Pre-rinsing* - Membranes fitted to Vivaspin® concentrators contain trace amounts of Glycerine and Sodium azide. Should these interfere with analysis they can be removed by rinsing fill volume of buffer solution or deionized water through the concentrator. Decant filtrate and concentrate before processing sample solution. If you do not want to use the pre-rinsed device immediately, store it in the refrigerator with buffer or water covering the membrane surface. Do not allow the membrane to dry out.
3. *Particle Sticking* - If microspheres appear to be sticking to the membrane, the device may be pre-rinsed with surfactant containing buffer. Surfactant may also be added to wash buffers. In either case, lowest amounts should be attempted first, e.g. 0.001-0.0005% Tween®20, Triton™-X100, etc.
4. *Sterilization of Polyethersulfone Membranes* - Vivaspin® devices should not be autoclaved as high temperatures will substantially increase membrane MWCO. To sterilize, use a 70% ethanol solution or sterilizing gas mixture.
5. *Chemical Compatibility* - Vivaspin® concentrators are designed for use with biological fluids and aqueous solutions. For chemical compatibility details, refer to Table 2.

CHEMICAL COMPATIBILITY (2hr contact time)

Table 2: OK = Acceptable ? = Questionable NO = Not recommended

Solutions	
Compatible pH range	pH 1–9
Acetic Acid (25.0%)	OK
Acetone (10.0%)	NO
Acetonitrile (10.0%)	NO
Ammonium Hydroxide (5.0%)	?
Ammonium Sulphate (saturated)	OK
Benzene (100%)	NO
n-Butanol (70%)	?
Chloroform (1.0%)	NO
Dimethyl Formamide (10.0%)	?
Dimethyl Sulfoxide (5.0%)	OK
Ethanol (70.0%)	OK
Ethyl Acetate (100%)	NO
Formaldehyde (30%)	OK
Formic Acid (5.0%)	OK

Solutions cont.	
Glycerine (70%)	OK
Guanidine HCl (6 M)	OK
Hydrocarbons, aromatic	NO
Hydrocarbons, chlorinated	NO
Hydrochloric Acid (1 M)	OK
Imidazole (300 mM)	OK
Isopropanol (70%)	OK
Lactic Acid (5.0%)	OK
Mercaptoethanol (1.0 M)	NO
Methanol (60%)	?
Nitric Acid (10.0%)	OK
Phenol (1.0%)	?
Phosphate Buffer (1.0 M)	OK
Polyethylene Glycol (10%)	OK
Pyridine (100%)	NO

Solutions cont.	
Sodium Carbonate (20%)	OK
Sodium Deoxycholate (5.0%)	OK
Sodium Dodecylsulfate (0.1 M)	OK
Sodium Hydroxide (2.5 M)	NO
Sodium Hypochlorite (200 ppm)	OK
Sodium Nitrate (1.0%)	OK
Sulfamic Acid (5.0%)	OK
Tetrahydrofuran (5.0%)	NO
Toluene (1.0%)	NO
Trifluoroacetic Acid (10%)	OK
Tween 20 (0.1%)	OK
Triton X-100 (0.1%)	OK
Urea (8 M)	OK

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STORAGE AND STABILITY

Vivaspin® ultrafiltration spin columns should be stored at room temperature. The devices should be used before the expiration date.

ORDERING INFORMATION

Cat. Code	Description
AA022	Vivaspin® 2mL Ultrafiltration Device

Order online anytime at **www.bangslabs.com.**