

Instructions for Use

# Vivaspin<sup>®</sup> 4

Vivaspin<sup>®</sup> 4 10K device for *in vitro* diagnostic use



85030-516-16



# SARTORIUS



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# 1 Vivaspin® 4 – Introduction

## 1.1 Storage Conditions | Shelf Life

Vivaspin® 4 ultrafiltration spin columns should be stored at 15 – 30°C. The devices should be used before the expiry date printed on the box.

## 1.2 Introduction

Vivaspin® 4 concentrators are disposable ultrafiltration devices for the concentration of biological samples. Maximum initial sample volumes range from 1 ml to 4 ml. They can be effectively used in either swing bucket or fixed angle rotors accepting 15 ml conical bottom centrifuge tubes.

The patented vertical membrane design and thin channel filtration chamber (US 5,647,990, second patent pending) minimises membrane fouling and provides high speed concentrations, even with particle laden solutions. Vivaspin® 4 is available with the high flux polyethersulfone membrane range which is recommended for most solutions.

The Vivaspin® 4 product line includes 1 cutoffs (Molecular Weight Cutoff, MWCO):

- Vivaspin® 4 10K device: 10,000 MWCO

Vivaspin® 4 10K filter devices are for *in vitro* diagnostic use and can be used to concentrate serum, urine, cerebrospinal fluid, and other body fluids prior to analysis. The Vivaspin® 4 devices are supplied non-sterile and are for single use only.

## 1.3 Operation

1. Select the most appropriate membrane for your sample. For maximum recovery select a MWCO at least 50% smaller than the molecular size of the species of interest.
2. Fill concentrator with up to maximum volume shown in table 1. (Ensure lid is fully seated).
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 speeds recommended in table 2 taking care not to exceed the maximum g force indicated by membrane type and MWCO.
5. Once the desired concentration is achieved, (see tables 3a and 3b, for a guide to concentration times), remove assembly and recover sample from the bottom of the concentrate pocket with a pipette. The filtrate tube can be sealed for storage.

## 1.4 Desalting | Buffer Exchange

1. Concentrate sample to desired level or at least 5x.
2. Empty filtrate container.
3. Refill concentrator with an appropriate solvent.
4. Concentrate the sample again and repeat the process until the concentration of contaminating microsolite is sufficiently reduced. Typically 3 wash cycles will remove 99% of initial salt content.

Equipment required	Vivaspin® 4
Centrifuge	
Rotor type	Swing bucket or Fixed angle
Minimum rotor angle	25°
Rotor cavity	To fit 15 ml (17 mm) conical bottom tubes
Concentrate recovery	
Pipette type	Fixed or variable volume
Recommended tip	Thin gel loader type

## 2 Technical Specifications

### 2.1 Technical Specifications

	Vivaspin® 4
Concentrator capacity	
Swing bucket rotor	4 ml
Fixed angle rotor	4 ml
Dimensions	
Total length	122 mm
Width	17 mm
Active membrane area	2.0 cm <sup>2</sup>

Hold up volume of membrane	<10 µl
Dead stop volume*	20 µl
Materials of construction	
Body	Polycarbonate
Filtrate vessel	Polypropylene
Concentrator cap	Polycarbonate
Membrane	Polyethersulfone

## 2.2 Recommended Spin Speed (xg)

Membrane	Vivaspin® 4	
	Fixed angle	Swing bucket
10K PES	8,000	4,000

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

## 3 Usage Tips

### 3.1 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.

### 3.2 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 deionised 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. Please do not allow the membrane to dry out.

### 3.3 Sanitization

Polyethersulfone membranes should not be autoclaved as high temperatures will substantially increase membrane MWCO. To sanitize, use a 70% ethanol solution or sanitizing gas mixture.

### 3.4 Chemical Compatibility

Vivaspin® concentrators are designed for use with biological fluids and aqueous solutions. For chemical compatibility details, refer to table 4.



## 4 Performance Characteristics

Table 3: Typical Performance Characteristics Vivaspin® 4

	Time to concentrate up to 30x [min.] at 20°C	Concentrate recovery %
Start volume	4 ml	4 ml
BSA 1.0 mg/ml (66,000 MW)		
10,000 MWCO PES	10	96%

## 5 Chemical Compatibility

Table 4: Chemical Compatibility

	Vivaspin® 4
<b>Solutions</b>	<b>PES</b>
<b>Compatible pH range</b>	<b>pH 1–9</b>
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%)	NO
Ethanol (70.0%)	OK
Ethyl Acetate (100%)	NO
Formaldehyde (30%)	OK
Formic Acid (5.0%)	OK
Glycerine (70%)	OK
Guanidine HCl (6 M)	OK
Hydrocarbons, aromatic	NO
Hydrocarbons, chlorinated	NO
Hydrochloric Acid (1 M)	OK
Imidazole (300 mM, max 2 hrs)	OK
Isopropanol (70%)	OK
Lactic Acid (5.0%)	OK
Mercaptoethanol (10 mM)	OK
Methanol (60%)	OK
Nitric Acid (10.0%)	OK
Phenol (1.0%)	NO
Phosphate Buffer (1.0 M)	OK
Polyethylene Glycol (10%)	OK
Pyridine (100%)	NO
Propanol (70%)	OK
Sodium Carbonate (20%)	NO
Sodium Deoxycholate (5.0%)	OK

Sodium Dodecylsulfate (0.1 M)	OK
Sodium Hydroxide (2.5 M)	NO
Sodium Hypochlorite (200 ppm)	NO
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










OK = Acceptable    ? = Questionable    NO = Not recommended

\* Tween® is a registered trademark of ICI Americas Inc.

\*\* Triton® is a registered trademark of Union Carbide Corp.

## 6 *In Vitro* Diagnostic Product Labeling

The following table defines the symbols found on Vivaspin® 4 10K device labels.

Symbol	Definition
	<i>In vitro</i> diagnostic medical device
	Catalogue number
	Do not reuse
	Use by
	Batch code
	Date of manufacture
	Manufacturer
	Temperature limitation
	Non-sterile product

# 7 Ordering Information

Vivaspin® 4 Polyethersulfone	Qty per box	Prod. no.
10,000 MWCO	500	VS0405

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