

# Vivascience Vivaspin 20 ml

Vivaspin Concentrators are disposable ultrafiltration devices for the concentration of biological samples. Maximum initial sample volume is 20 ml. It can effectively be used in either swing bucket or fixed angle rotors accepting 50 ml centrifuge tubes. The VS20 uses a PES (Polyethersulfone) membrane.

The patented vertical membrane design and thin channel filtration chamber (US 5,647,990) minimises membrane fouling and provides high speed concentrations, even with particle laden solutions.

## Equipment Required

1. Centrifuge with swing bucket of fixed angle (minimum 25°) rotor.

Device	Carrier Required
Vivaspin 20	50 ml / 29 mm Ø

2. Pipettes for sample delivery and removal. For maximum recovery a thin gel loader type is recommended.

## 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 volumes 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).

Equipment required	Vivaspin 20
Centrifuge	
Rotor type	Swing bucket or Fixed angle
Minimum rotor angle	25°
Rotor cavity	To fit 50 ml conical bottom tubes
Minimum effective speed	1,500 g (Swing bucket rotor)
Recommended speed	3,000 g (Swing bucket rotor)
Maximum speed	6,000 g (Swing bucket rotor)
Concentrate recovery	
Pipette type	Fixed or variable volume
Recommended tip	Thin gel loader type

Table 1: Technical specifications	Vivaspin 20
Concentrator capacity	
Swing bucket rotor	20 ml
Fixed angle rotor	14 ml
Dimensions	
Total length	116 mm
Width	28 mm
Active membrane area	6.0 cm <sup>2</sup>
Hold-up volume, membrane and support	< 20 µl
Dead stop volume	≈ 50 µl
Materials of construction	
Body	Polycarbonate
Filtrate vessel	Polycarbonate
Concentrator cap	Polypropylene
Membrane	Polyethersulfone

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 3 for guide to concentration times), remove assembly and recover sample from the bottom of the concentrate pocket with a pipette.

## Desalting/Buffer Exchange

1. Concentrate sample to desired level.
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 microsolutes is sufficiently reduced. Typically 3 wash cycles will remove 99 % of initial salt content.

Table 2: Recommended Spin Speed (x g)			
Device	VS20 (10kDa MWCO)		
Rotor	min	typical	max
Fixed angle	2,000	6,000	8,000
Swing bucket	1,500	3,000	6,000

### 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. Prerinsing

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.

#### 3. Sterilisation of Polyethersulfone Membranes

Vivaspin devices should not be autoclaved as high temperatures will substantially increase membrane MWCO. To sterilise, use a 70 % ethanol solution or sterilising gas mixture.

Table 3: Typical performance VS20	Time to concentrate 30x min. at 20°C		Concentrate recovery %	
	Swing bucket rotor		25° Fixed angle rotor	
Start Volume	20 ml	20 ml	14 ml	14 ml
Centrifugal force	3,000 g	3,000 g	6,000 g	6,000 g
BSA 1.0 mg/ml (66,000 MW)				
5,000 MWCO PES	23	99 %	29	99 %
10,000 MWCO PES	16	98 %	17	98 %
30,000 MWCO PES	13	98 %	15	98 %
IgG 0.25 mg/ml (160,000 MW)				
30,000 MWCO PES	27	97 %	20	95 %
50,000 MWCO PES	27	96 %	22	95 %
100,000 MWCO PES	25	91 %	20	90 %