LABORATORY

# Centrifugal Devices

## Facilitate pure product with > 90% recoveries in just minutes


- Accelerate sample processing – Concentrate and purify samples with starting volumes of < 50 µL to 60 mL.
- Maximize sample recovery – Obtain high flow rates and low non-specific protein and nucleic acid binding.
- Add versatility – Available in various membrane types including low-binding Bio-Inert® (modified nylon), Supor® (polyethersulfone), and wwPTFE membranes, as well as Omega™ (modified polyethersulfone) ultrafiltration membrane in a variety of MWCOs.
- Prevent solution bypass – Membrane seals stop solution leakage, minimizing sample loss.
- Easy visual identification – Devices are color-coded for a wide variety of membranes, ranging from 1 kD to 0.45 µm.

## *Applications*

Centrifugal devices can replace traditional separation techniques, such as column chromatography, preparative electrophoresis, alcohol or salt precipitation, dialysis, and gradient centrifugation, when performing the following:

- Protein or nucleic acid concentration
- Desalting
- Buffer exchange
- Deproteination of biological samples
- Fractionation of protein mixtures
- Separation of primers from PCR products
- Separation of labeled nucleic acids or proteins from unincorporated nucleotides
- Virus concentration or removal
- Clarification of cell lysates and tissue homogenates
- Nucleic acid isolation

# How to Choose the Best Centrifugal Ultrafiltration Device

Pall's centrifugal devices simplify many common nucleic acid and protein sample preparation procedures. These devices provide efficient concentration and salt removal of samples from 50 µL to 60 mL in just minutes. Choose from membranes that have been developed to assure low non-specific biomolecule binding and typically provide > 90% recovery of target biomolecules.

## Ultrafiltration Method

Ultrafiltration is a membrane separation technique used to separate extremely small particles and dissolved molecules in fluids. The primary basis for separation is molecular size, although other factors such as molecule shape and charge can also play a role. Molecules larger than the membrane pores will be retained, but not bound, at the surface of the membrane (not in the polymer matrix as they are retained in microporous membranes) and concentrated during the ultrafiltration process.

Compared to non-membrane processes (chromatography, dialysis, solvent extraction, or centrifugation), ultrafiltration:

- Is gentler to the molecules being processed.
- Does not require an organic extraction which may denature labile proteins.
- Maintains the ionic and pH conditions.
- Is fast and relatively inexpensive.
- Can be performed at low temperatures (for example, in the cold room).
- Is very efficient and can simultaneously concentrate and purify molecules.

The retention properties of ultrafiltration membranes are expressed as Molecular Weight Cut-off (MWCO) and measured in Kilodaltons (kD). This value refers to the approximate molecular weight of a dilute globular solute (i.e., a typical protein) which is 90% retained by the membrane. However, a molecule's shape can have a direct effect on its retention by a membrane. For example, linear molecules like DNA may find their way through pores that will retain a globular species of the same molecular weight.

There are three generic applications for ultrafiltration:

1. **Concentration.** Ultrafiltration is a very convenient method for the concentration of dilute protein or DNA/RNA samples. It is gentle (does not shear DNA as large as 100 Kb or cause loss of enzymatic activity in proteins) and very efficient (typically > 90% recovery).
2. **Desalting and Buffer Exchange (Diafiltration).** Ultrafiltration provides a convenient and efficient way to remove or exchange salts, remove detergents, separate free from bound molecules, remove low molecular weight components, or rapidly change the ionic or pH environment.
3. **Fractionation.** Ultrafiltration will not accomplish a sharp separation of two molecules with similar molecular weights. The molecules to be separated should differ by at least one order of magnitude (10X) in size for effective separation. Fractionation using ultrafiltration is effective in applications, such as the preparation of protein-free filtrates, the separation of unbound or unincorporated label from DNA and protein samples, and the purification of PCR products from synthesis reactions.

## Device Selection Based on Volume

**Table 1**
*Device Selection by Volume*

| Device | Sample Volume |
|---|---|
| Nanosep® device | < 0.5 mL |
| Microsep™ Advance device | 0.5 - 5.0 mL |
| Macrosep® Advance device | 5 - 20 mL |
| Jumbosep™ device | 20 - 60 mL |

## Membrane Selection Based on Application

These membranes meet the challenges of a wide range of applications with superior performance and stability:

- **Omega** (modified polyethersulfone) ultrafiltration membrane for rapid concentrating and desalting.
- **Bio-Inert** (modified nylon), **Supor** (polyethersulfone), and **wwPTFE** microfiltration membranes for removing particulate (such as gel debris).
- **Glass Fiber** for nucleic acid binding.

## Choosing the Correct MWCO

Once sample volume is determined, the next step is to select the appropriate MWCO (for ultrafiltration) or pore size (for microfiltration). MWCOs are nominal ratings based on the ability to retain > 90% of a solute of a known molecular weight (in kilodaltons). Table 2 provides retention characteristics of different MWCO membranes for some solutes. For proteins, it is recommended that an MWCO be selected that is three to six times smaller than the molecular weight of the solute being retained. If flow rate is a consideration, choose a membrane with an MWCO at the lower end of this range (3X); if the main concern is retention, choose a tighter membrane (6X).

It is important to recognize that retention of a molecule by an ultrafiltration membrane is determined by a variety of factors, among which its molecular weight serves only as a general indicator.

Therefore, choosing the appropriate MWCO for a specific application requires the consideration of a number of factors including molecular shape, electrical charge, sample concentration, sample composition, and operating conditions.

Because different manufacturers use different molecules to define the MWCO of their membranes, it is important to perform pilot experiments to verify membrane performance in a particular application.

*Common Variables that Increase Molecule Passage:*

- Sample concentration less than 1 mg/mL.
- Linear versus globular molecules.
- High transmembrane pressure created by g-force in centrifugal concentrators. (This is especially important in the case of linear molecules, for example DNA fragments. Decreasing the g-force can increase retention of molecules by a membrane.)
- Buffer composition that favors breakup of molecules.
- pH and ionic conditions that change the molecule (for example, cause conformational changes).

*Common Variables that Decrease Molecule Passage:*

- Sample concentration higher than 1 mg/mL.
- Buffer conditions that permit molecules to aggregate.
- Presence of other molecules that increase sample concentration.
- Lower transmembrane pressure (in the case of centrifugal concentrators, lower g-force).
- Adsorption to the membrane or device.
- Low temperature (4 °C versus 24 °C).

**Table 2**
*MWCO Selection for Protein Applications*

| MWCO | Membrane Nominal Pore Size* | Biomolecule Size | Biomolecule Molecular Weight |
|---|---|---|---|
| 1K** | – | – | 3K – 10K |
| 3K | – | – | 10K – 30K |
| 10K | – | – | 30K – 90K |
| 30K | – | – | 90K – 300K |
| 100K | 10 nm | 30 – 90 nm | 300K – 900K |
| 300K*** | 35 nm | > 90 nm | > 900K |

**Nominal pore size as measured by electron microscopy*
***Not available in Nanosep*
****Not available in Microsep or Macrosep Advance*

*MWCO Selection for Nucleic Acid Applications*

| MWCO | Base Pairs (DS) | Nucleotides (SS) |
|---|---|---|
| 1K* | 5 – 16 bp | 9 – 32 nt |
| 3K | 16 – 50 bp | 32 – 95 nt |
| 10K | 50 – 145 bp | 92 – 285 nt |
| 30K | 145 – 285 bp | 285 – 950 nt |
| 100K | 475 – 1,450 bp | 950 – 2,900 nt |
| 300K** | > 1,450 bp | > 2,900 nt |

**Not available in Nanosep*
***Not available in Microsep or Macrosep Advance*

*MWCO Selection for Virus Applications*

| MWCO | Membrane Nominal Pore Size* | Virus or Particle Diameter |
|---|---|---|
| 100K | 10 nm | 30 – 90 nm |
| 300K* | 35 nm | > 90 nm |

**Nominal pore size as measured by electron microscopy.*

## Color-Coding

Centrifugal devices from Pall Laboratory are available in a range of MWCOs color-coded for easy identification.

| MWCO/Pore Size | Color |
|---|---|
| 1K | yellow |
| 3K | gray |
| 10K | blue |
| 30K | red |
| 50K | green |
| 100K | clear |
| 300K | orange |
| 1,000K | purple |
| 0.2 µm | aqua |
| 0.45 µm | wildberry and clear |

# Nanosep, Nanosep MF and Nanosep NAB Centrifugal Devices

*Simple, reliable processing samples of 50 to 500 µL*

- Ensures rapid processing of samples.
- Typical recoveries are > 90%. Available with low protein-binding Omega, Bio-Inert, and wwPTFE membranes.
- A wide range of MWCOs, color-coded for easy identification.
- Constructed of low-binding polypropylene.
- Ultrasonically welded seals prevent bypass or seal failure.
- Fits standard centrifuge rotors that accept 1.5 mL tubes.

## Applications

- Concentrate, purify, and desalt oligonucleotides, DNA, and RNA.
- Clean up labeling and PCR reactions.
- Isolate DNA from agarose gel slices.
- Separate oligonucleotides and RNA from acrylamide gels.
- Concentrate PCR products regardless of size with 100K device if primer removal is required.
- Prepare protein sample for analytical techniques (e.g., HPLC, LC/MS).

## Specifications

**Materials of Construction**

*Nanosep Devices*

Filter Media: Omega (modified polyethersulfone) ultrafiltration membrane

*Nanosep MF Devices*

Filter Media: Bio-Inert (modified nylon) and wwPTFE membranes

*Nanosep NAB Device*

Filter Media: Glass fiber

**Sample Reservoir, Membrane Support Base, and Filtrate Receiver**

Polypropylene

**Effective Filtration Area**

0.28 $cm^2$

**Dimensions**

Overall Length (fully assembled with cap): 4.5 cm (1.8 in.)

**Capacities**

Maximum Sample Volume: 500 µL
Final Concentrate Volume: 15 µL
Filtrate Receiver Volume: 500 µL
Hold-up Volume (membrane/support): < 5 µL

**Operating Temperature Range**

0 - 40 °C (32 - 104 °F)

**pH Range**

Nanosep Devices: 1 - 14
Nanosep MF Devices: 3 - 14

**Maximum Centrifugal Force**

14,000 x g (for nucleic acid applications reduce centrifugal force to 5,000 x g)

**Centrifuge**

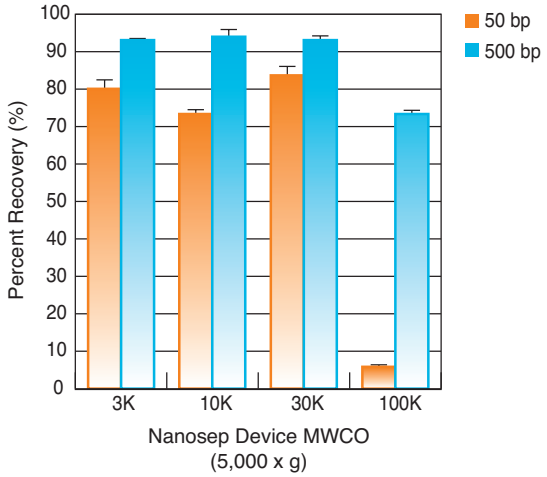
Fits rotors that accept 1.5 mL tubes

**Sanitization**

Provided non-sterile. May be sanitized by filtering 70% ethanol through the device prior to use.

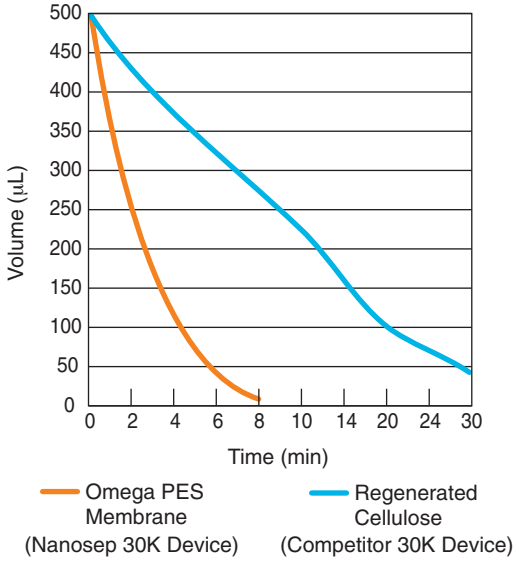
## Performance

**DNA Recovery as a Function of Device MWCO**

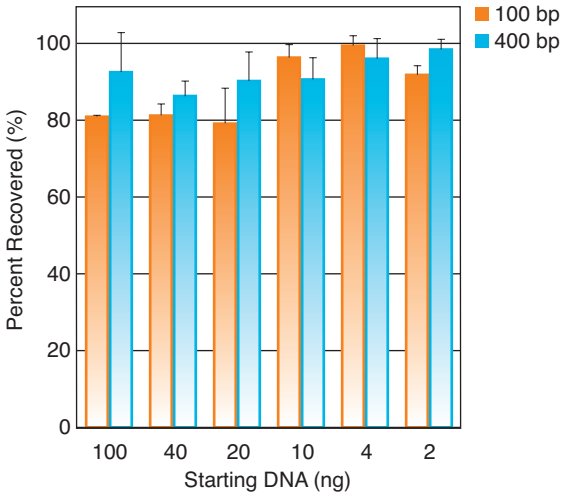



*A 500 µL sample of a 100 µg/mL DNA fragment solution containing 50 and 500 bp double-stranded DNA fragments was centrifuged at 5,000 x g in Nanosep devices to a final volume of 50 µL. Recovered samples were quantified using absorbance at 260 nm. The 100K device was able to differentiate between the sizes of the DNA fragments.*

### Centrifugal Device Spin Times




### DNA Recovery




*Nanosep 30K devices were used to filter dilute radioactive DNA fragments. In order to accurately quantitate DNA recovery from dilute samples, PCR products (100 and 400 bp) were dual labeled to low-specific activity with $^{32}$P-labeled dCTP and $^{32}$P-labeled dATP and prepared for filtration. After synthesis, unincorporated nucleotides, as well as termination products, were removed by ultrafiltration using a 30K Nanosep device. The resulting retentate was checked for size and quantitated using gel electrophoresis. Labeled DNA in quantities ranging from 100 ng all the way down to 2 ng per device was diluted to 500 µL using TE. The samples (in triplicate) were centrifuged at 5,000 x g for 10 minutes (spun to dryness) and recovered in two washes of 20 µL water. The resulting retentate was added to a counting vial containing scintillation solution and counted.*

## *Ordering Information*

### Nanosep Centrifugal Devices with Omega Membrane

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17194771 | OD003C33 | 3K, gray | 24/pkg |
| 17104781 | OD003C34 | 3K, gray | 100/pkg |
| 17114781 | OD003C35 | 3K, gray | 500/pkg |
| 17134781 | OD010C33 | 10K, blue | 24/pkg |
| 17144781 | OD010C34 | 10K, blue | 100/pkg |
| 17154781 | OD010C35 | 10K, blue | 500/pkg |
| 17174781 | OD030C33 | 30K, red | 24/pkg |
| 17184781 | OD030C34 | 30K, red | 100/pkg |
| 17194781 | OD030C35 | 30K, red | 500/pkg |
| 17114791 | OD100C33 | 100K, clear | 24/pkg |
| 17124791 | OD100C34 | 100K, clear | 100/pkg |
| 17134791 | OD100C35 | 100K, clear | 500/pkg |
| 17154791 | OD300C33 | 300K, orange | 24/pkg |
| 17164791 | OD300C34 | 300K, orange | 100/pkg |
| 17174791 | OD300C35 | 300K, orange | 500/pkg |

### Nanosep MF Centrifugal Devices with Bio-Inert Membrane

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17194791 | ODM02C33 | 0.2 µm, aqua | 24/pkg |
| 17104801 | ODM02C34 | 0.2 µm, aqua | 100/pkg |
| 17114801 | ODM02C35 | 0.2 µm, aqua | 500/pkg |
| 17124801 | ODM45C33 | 0.45 µm, wildberry | 24/pkg |
| 17134801 | ODM45C34 | 0.45 µm, wildberry | 100/pkg |
| 17144801 | ODM45C35 | 0.45 µm, wildberry | 500/pkg |

### Nanosep MF Centrifugal Devices with wwPTFE Membrane

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17174801 | ODPTFE02C34 | 0.2 µm | 100/pkg |
| 17184801 | ODPTFE02C35 | 0.2 µm | 500/pkg |
| 17194801 | ODPTFE04C34 | 0.45 µm, clear | 100/pkg |
| 17104811 | ODPTFE04C35 | 0.45 µm, clear | 500/pkg |

### Nanosep Centrifical Devices for NAB with Glass Fiber Membrane

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17154801 | ODNABC33 | NAB, white | 24/pkg* |
| 17164801 | ODNABC34 | NAB, white | 100/pkg* |

**Both pack sizes come with 2 additional filtrate tubes for each device*

# Microsep Advance Centrifugal Devices

*Precise, quick recovery of microliter volumes of concentrate from starting volumes up to 5.0 mL*


- High recovery. Achieve 50X concentration and > 90% recovery in just minutes.
- Features deadstop to prevent samples from spinning to dryness.
- Versatile Omega membrane is available in a variety of MWCOs.
- Color-coded and laser etched for easy identification.

## Applications

- Concentrate dilute protein samples prior to electrophoresis.
- Exchange buffer and remove salt in samples.
- Remove proteins and particulate from samples for HPLC analysis of drugs, amino acids, and antibodies.
- Isolate low molecular weight compounds from fermentation broths for natural product screening.
- Recover biomolecules from cell culture supernatants or lysates.
- Clarify samples with gross particulate.

## Specifications

**Materials of Construction**
Filter Media: Omega (modified polyethersulfone) and Supor (polyethersulfone) membranes
Sample Reservoir, Filtrate Receiver and Cap: Polypropylene
Paddle: Polyethylene

**Effective Filtration Area**
3.3 $cm^2$

**Dimensions**
Diameter: 17 mm (0.7 in.)
Length: 12.0 cm (4.9 in.)

**Operating Temperature Range**
0 - 40 °C (32 - 104 °F)

**Capacities**
Maximum Sample Volume: 5.0 mL
Final Concentrate Volume:
65 µL (swinging bucket)
80 µL (45° angle rotor)
100 µL (34° angle rotor)
Filtrate Receiver Volume: 6.5 mL
Hold-up Volume: 40 µL (membrane and paddle)

**pH Range**
1 - 14

**Maximum Centrifugal Force**
7,500 x g (ultrafiltration)
14,000 x g (microfiltration)

**Centrifuge**
Fits centrifuges that accept standard 17 x 100 mm tubes and is capable of 3,000 to 14,000 x g

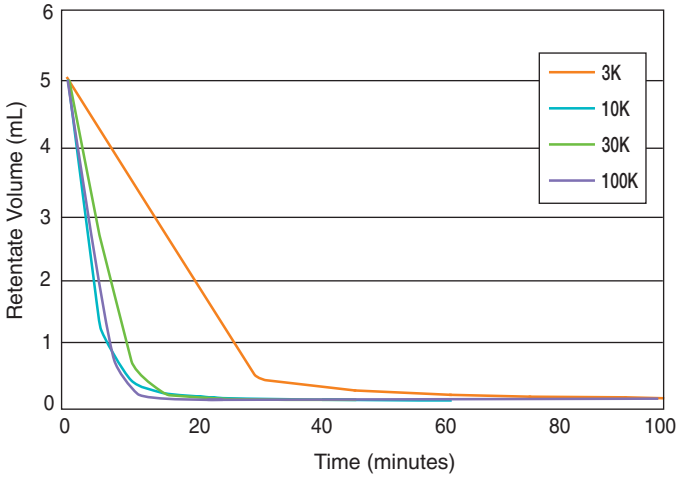
**Sanitization**
Provided non-sterile. May be sanitized by filtering 70% ethanol through the device prior to use.

## Performance

Rotor Selection Determines Final Concentrate Volume

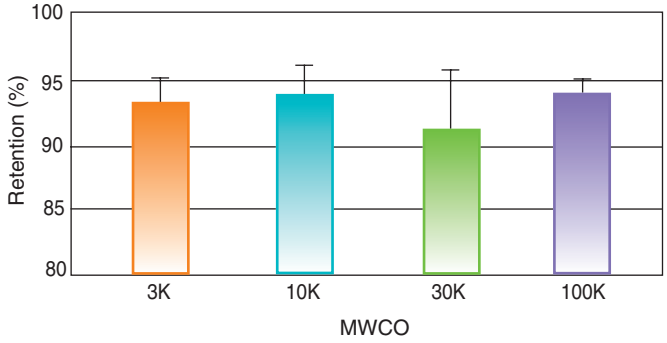
| Rotor Angle | Deadstop Volume |
|---|---|
| Swinging Bucket | 65 µL |
| 45º Fixed Angle | 80 µL |
| 34º Fixed Angle | 100 µL |

### Microsep Advance Centrifugal Devices: Reduced Spin Time




*Protein solutions were processed in each of the Microsep Advance devices. Average time (minutes) is plotted against mL of remaining product to be filtered using a 34° fixed angle rotor at 5,000 g. Solutions are 3K: Cytochrome C, 250 µg/mL; 10K: BSA, 1 mg/mL; 30K: IgG, 1 mg/mL; and 100K: Thyroglobulin, 1 mg/mL.*

### Microsep Advance Centrifugal Devices: Retention Efficiency




*Protein solutions were processed in each of the Microsep Advance devices. Average percent retention using 34° fixed angle rotor at 5,000 g is displayed for each MWCO. Solutions were 3K: Cytochrome C, 250 µg/mL; 10K: BSA, 1 mg/mL; 30K: IgG, 1 mg/mL; and 100K: thyroglobulin, 1 mg/mL.*

## Ordering Information

### Microsep Advance Centrifugal Devices with Omega Membrane

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17164741 | MCP001C41 | 1K, yellow | 24/pkg |
| 17174741 | MCP001C46 | 1K, yellow | 100/pkg |
| 17184741 | MCP003C41 | 3K, gray | 24/pkg |
| 17194741 | MCP003C46 | 3K, gray | 100/pkg |
| 17104751 | MCP010C41 | 10K, blue | 24/pkg |
| 17114751 | MCP010C46 | 10K, blue | 100/pkg |
| 17124751 | MCP030C41 | 30K, red | 24/pkg |
| 17134751 | MCP030C46 | 30K, red | 100/pkg |
| 17144751 | MCP100C41 | 100K, clear | 24/pkg |
| 17154751 | MCP100C46 | 100K, clear | 100/pkg |

### Microsep Advance Centrifugal Devices with Supor Membrane

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17164751 | MCPM02C67 | 0.2 µm, aqua | 24/pkg |
| 17174751 | MCPM02C68 | 0.2 µm, aqua | 100/pkg |
| 17184751 | MCPM45C67 | 0.45 µm, wildberry | 24/pkg |
| 17194751 | MCPM45C68 | 0.45 µm, wildberry | 100/pkg |

# Macrosep Advance Centrifugal Devices

*Quickly concentrates up to 20 mL of biological sample without valuable sample loss*


- Rapidly concentrates 20 mL sample volumes to 0.5 mL.
- Provides high recoveries, typically > 90%.
- Low protein-binding Omega membrane and polypropylene housing minimize losses due to non-specific binding.
- Versatile Omega membrane is available in a variety of MWCOs.
- Built-in deadstop prevents spinning to dryness.
- Color-coded for easy identification.

## Applications

- Concentrate and desalt proteins.
- Exchange buffer or remove salt of chromatography eluates and gradient fractions.
- Recover proteins or other molecules from cell culture supernatants.
- Remove particulate from aqueous solutions.

## Specifications

**Materials of Construction**
Filter Media: Omega (modified polyethersulfone) and Supor (polyethersulfone) membranes
Sample Reservoir, Filtrate Receiver, and Cap: Polypropylene
Paddle: Polyethylene

**Effective Filtration Area**
7.2 $cm^2$

**Dimensions**
Diameter: 50 mm (1.9 in.)
Length: 12.0 cm (4.7 in.)

**Capacities**
Maximum Sample Volume: 20 mL
Final Concentrate Volume: As low as 450 µL, depending on rotor used
Filtrate Receiver Volume: 22 mL
Hold-up Volume: 80 µL (membrane and paddle)

**Operating Temperature Range**
0 - 40 °C (32 - 104 °F)

**pH Range**
1 - 14

**Maximum Centrifugal Force**
5,000 x g (ultrafiltration)
14,000 x g (microfiltration)

**Centrifuge**
Fits centrifuges that accept standard 50 mL conical end tubes

**Sanitization**
Provided non-sterile. May be sanitized by filtering 70% ethanol through the device prior to use.

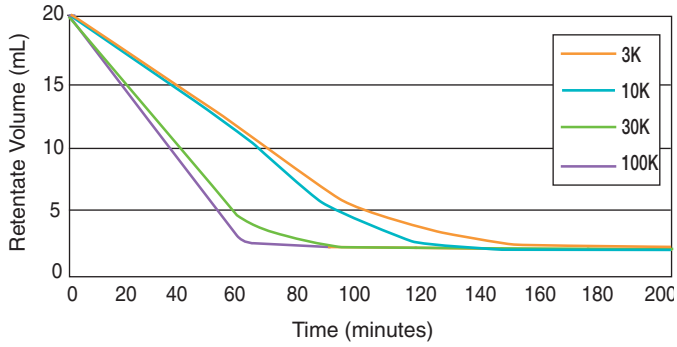
## Performance

**Rotor Selection Determines Final Concentrate Volume**

| RotorAngle | Deadstop Volume |
|---|---|
| Swinging Bucket | 450 µL |
| 45° Fixed Angle | 1.2 - 1.5 mL |
| 34° Fixed Angle | 1.5 mL |

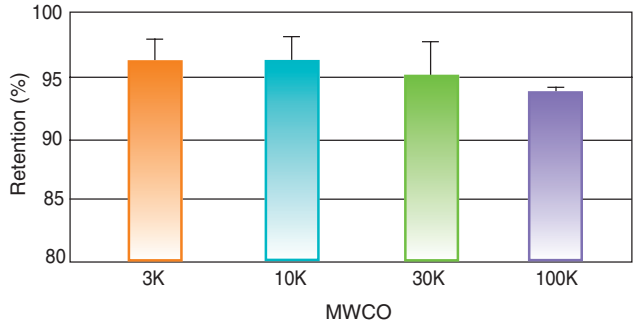
## *Performance* *(continued)*

### Macrosep Advance Centrifugal Devices: Reduced Spin Time




*Protein solutions were processed in each of the Macrosep Advance devices. Average time (minutes) is plotted against mL of remaining product to be filtered using a swinging bucket rotor at 5,000 g. Solutions are 3K: Protamine Sulfate, 0.1% in 1X PBS; 10K: Cytochrome C, 0.025% in 1X PBS; 30K: IgG, 0.1% in 1X PBS; and 100K: Apoferritin, 0.1% in 1X PBS.*

### Macrosep Advance Centrifugal Devices: Retention Efficiency




*Proteins solutions were processed in each of the Macrosep Advance devices. Average percent retention using a swinging bucket rotor at 5,000 g is displayed for each MWCO. Solutions were 3K: Protamine Sulfate, 0.1% 1X PBS; 10K: Cytochrome C, 0.025% in 1X PBS; 30K: IgG, 0.1% in 1X PBS; and 100K: Apoferritin, 0.1% in 1X PBS.*

## *Ordering Information*

### Macrosep Advance Centrifugal Devices with Omega Membrane

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17124731 | MAP001C37 | 1K, yellow | 24/pkg |
| 17134731 | MAP001C38 | 1K, yellow | 100/pkg |
| 17144731 | MAP003C37 | 3K, gray | 24/pkg |
| 17154731 | MAP003C38 | 3K, gray | 100/pkg |
| 17164731 | MAP010C37 | 10K, blue | 24/pkg |
| 17174731 | MAP010C38 | 10K, blue | 100/pkg |
| 17184731 | MAP030C37 | 30K, red | 24/pkg |
| 17194731 | MAP030C38 | 30K, red | 100/pkg |
| 17104741 | MAP100C37 | 100K, clear | 24/pkg |
| 17114741 | MAP100C38 | 100K, clear | 100/pkg |

### Macrosep Advance Centrifugal Devices with Supor Membrane

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17124741 | MAPM02C67 | 0.2 µm, aqua | 24/pkg |
| 17134741 | MAPM02C68 | 0.2 µm, aqua | 100/pkg |
| 17144741 | MAPM45C67 | 0.45 µm, wildberry | 24/pkg |
| 17154741 | MAPM45C68 | 0.45 µm, wildberry | 100/pkg |

# Jumbosep Centrifugal Devices

*Convenient and reliable concentration, purification, and diafiltration of 15 to 60 mL biological samples*


- Concentrates 60 mL sample volumes to 5 mL in 30 minutes.
- Provides high recoveries, typically > 90%.
- Low protein-binding Omega membrane and polysulfone housing minimize losses due to non-specific binding.
- Versatile Omega membrane is available in a variety of MWCOs, color-coded for easy identification.
- Built-in deadstop prevents spinning to dryness.
- Unique sealing mechanism prevents retentate leakage and filtrate contamination.
- Economical. Sample reservoir and filtrate receiver can be sanitized and reused.

## Applications

Replaces dialysis, chemical precipitation, and lyophilization when:

- Concentrating and desalting proteins.
- Exchanging buffer or removing salt of chromatography eluates and gradient fractions.
- Separating biomolecules from cell culture supernatants.
- Concentrating or removing viruses.
- Performing crude fractionation of dilute protein mixtures.
- Removing debris and particulates from cell lysates.

## Specifications

**Materials of Construction**
Filter Media: Omega (modified polyethersulfone) membrane
Sample Reservoir and Filtrate Receiver: Polysulfone
Sample Reservoir Cap: Polyethylene
Insert Without Membrane: High density polyethylene
Filtrate Receiver Cap and Insert Release: Polypropylene

**Effective Filtration Area**
15.2 $cm^2$

**Dimensions**
Outside Diameter (Maximum): 6 cm (2.4 in.)
Overall Height (Fully Assembled with Cap): 11.3 cm (4.5 in.)

**Capacities**
Maximum Sample Volume: 60 mL
Final Concentrate Volume: 3.5 - 4 mL
Maximum Filtrate Receiver Volume: 60 mL
Hold-up Volume (membrane/support): 0.2 mL

**Operating Temperature Range**
0 - 40 °C (32 - 104 °F)

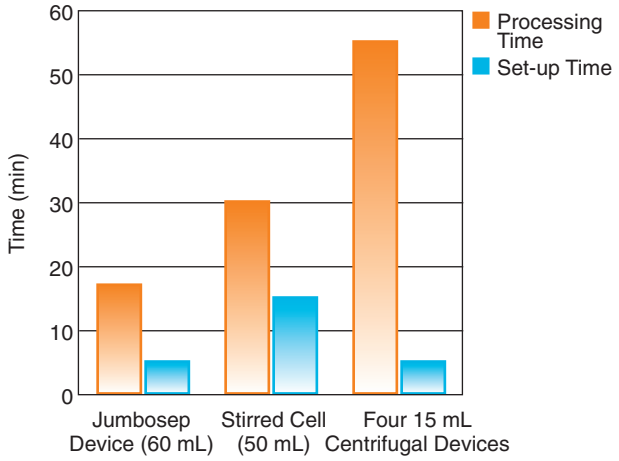
**pH Range**
1 - 14

**Centrifuge**
Swinging bucket rotor is required that accepts flat-bottomed 250 mL bottles and is capable of spinning at up to 3,000 x g

**Sanitization**
Provided non-sterile. The entire device, including the filter media, may be sanitized by filtering 70% ethanol through it prior to use.

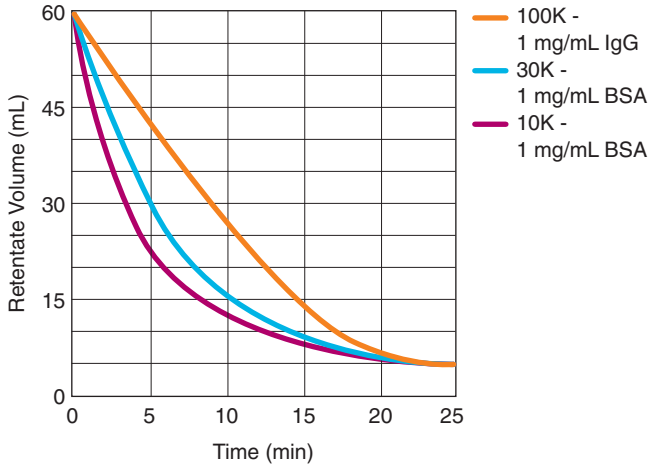
## Performance

**Jumbosep Device Reduces Processing Time Over Other Devices**




*1 mg/mL BSA solution was processed in each of the above devices until a 15-fold concentration was achieved.*

**Concentration Time**




*Concentrate dilute protein samples in less than 30 minutes with 10, 30, and 100K Jumbosep devices.*

## Ordering Information

The Generic Starter Kit includes four holders, cups, and caps. Membrane inserts sold separately. Starter Kits include four holders, cups, caps, and membrane inserts.

**Jumbosep Centrifugal Device Starter Kits**

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17124721 | FD000K65 | Generic starter kit, (no membrane inserts) | 4/pkg |
| 17144721 | FD003K65 | 3K starter kit, gray | 4/pkg |
| 17164721 | FD010K65 | 10K starter kit, blue | 4/pkg |
| 17174721 | FD030K65 | 30K starter kit, red | 4/pkg |
| 17184721 | FD100K65 | 100K starter kit, clear | 4/pkg |
| 17194721 | FD300K65 | 300K starter kit, orange | 4/pkg |

**Jumbosep Centrifugal Device Membrane Inserts**

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17124781 | OD003C65 | 3K membrane insert, gray | 12/pkg |
| 17164781 | OD010C65 | 10K membrane insert, blue | 12/pkg |
| 17104791 | OD030C65 | 30K membrane insert, red | 12/pkg |
| 17144791 | OD100C65 | 100K membrane insert, clear | 12/pkg |
| 17184791 | OD300C65 | 300K membrane insert, orange | 12/pkg |

**Accessories and Replacement Parts**

| Fisher Scientific Part No. | Pall Part No. | Description | Pkg |
|---|---|---|---|
| 17134721 | FD001X65 | Filtrate receiver and cap | 12/pkg |
| 17154721 | FD003X65 | Insert release | 24/pkg |

## Related Literature

- Protocol Guide, Nanosep Centrifugal Devices, www.pall.com/lab
- Technical Report, Nanosep Centrifugal Ultrafiltration Devices and PCR: Before and After, www.pall.com/lab
- Technical Report, Single-tube DNA Purification and Cloning Using Ultrafiltration Devices, www.pall.com/lab
- Technical Report, Fast and Efficient Elution of Proteins from Polyacrylamide Gels Using Nanosep Centrifugal Devices, www.pall.com/lab

## Related Products Available from Pall

- AcroPrep™ Advance 96- and 384-well Filter Plates are an excellent platform for a wide variety of molecular biology, analytical, and high throughput sample preparation and detection applications.
- BioTrace™ and Biodyne® Transfer Membranes offer precise performance and compatibility with nearly every detection system available.
- Minimate Tangential Flow Filtration Capsule offers fast and efficient concentration and diafiltration (desalting) of biomolecules on the same system.
- Omega Ultrafiltration Membrane Discs are highly porous, providing fast flow rates and high recoveries.



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