


# Pierce™ Protein Concentrators, PES

For 3K, 10K, 30K, 50K, and 100K MWCO: 2–6 mL

**Catalog Number** 88514, 88515, 88516, 88517, 88521, 88522, 88538, 88539, 88523, and 88524

**Doc. Part No.** 2162596 **Pub. No.** MAN0015695 **Rev.** B.0

 **WARNING!** Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves. Safety Data Sheets (SDSs) are available from [thermofisher.com/support](https://www.thermofisher.com/support).

## Product description

The Thermo Scientific™ Pierce™ Protein Concentrators are disposable ultrafiltration centrifugal devices that provide reliable and consistent results for concentrating, diafiltrating, and buffer exchanging of biological samples such as proteins and nucleic acids. The 2–6 mL concentrators have a built-in dead stop and contain a vertical low protein-binding, high-flux polyethersulfone (PES) membrane, which allows for processing of volumes between 2 mL and 6 mL. The PES membrane is available in 5 distinct molecular-weight cutoffs (MWCOs) of 3K, 10K, 30K, 50K, and 100K. The MWCOs are etched on the sides of the concentrators for easy identification, and a clear window with graduations on the side of each device allows for visual determination of the retentate volume.

Typical protein recovery is > 90% for proteins that are 2-fold greater than the membrane MWCO (see Table 2). Sample concentration of 10- to 30-fold can typically be achieved in 15 minutes or less (see Figure 1).

The 2–6 mL Concentrators are compatible with most swinging-bucket and fixed-angle centrifuges that accommodate 15 mL conical tubes.

## Contents and storage

**Table 1** Pierce™ Protein Concentrators

Product	Cat. No.	Capacity	Amount	Storage
Pierce™ Protein Concentrator, 3K MWCO <sup>[1]</sup>	88514	2–6 mL	10 per pkg	Room temperature
	88515		24 per pkg	
Pierce™ Protein Concentrator, 10K MWCO	88516		10 per pkg	
	88517		24 per pkg	
Pierce™ Protein Concentrator, 30K MWCO	88521		10 per pkg	
	88522		24 per pkg	
Pierce™ Protein Concentrator, 50K MWCO	88538		10 per pkg	
	88539		24 per pkg	
Pierce™ Protein Concentrator, 100K MWCO	88523		10 per pkg	
	88524		24 per pkg	

<sup>[1]</sup> Molecular weight cutoff

## Required materials not supplied

Unless otherwise indicated, all materials are available through [thermofisher.com](http://thermofisher.com). MLS: Fisher Scientific ([fisherscientific.com](http://fisherscientific.com)) or other major laboratory supplier.

Item	Source
Swinging-bucket (2,000–4,000 × <i>g</i> or fixed-angle (5,000–10,000 × <i>g</i> ) centrifuge that accommodates 15 mL conical tubes	MLS
Pipet for retentate recovery	MLS
<i>For desalting:</i> Exchange buffer	MLS

## Procedural guidelines

- For swinging-bucket centrifuges, models capable of generating 2,000–4,000 × *g* are recommended. Use a maximum centrifugal force of 4,000 × *g* for 2–6 mL, 3K, 10K, 30K, 50K, and 100K concentrators in a swinging-bucket rotor. For fixed-angle centrifuges, models capable of generating 5,000–10,000 × *g* are recommended. Use a maximum centrifugal force of 8,000 × *g* for 2–6 mL, 3K, 10K, 30K, and 50K, and 6,000 × *g* for 100K concentrators in a fixed-angle rotor.
- When using a fixed-angle rotor, position the concentrator so that the printed sample window faces outward.
- Ensure the concentrators are properly balanced in the rotor before centrifugation. The counterbalance must be another concentrator to ensure proper balance due to changing sample distribution during processing. Do not use a filled conical tube as a counterbalance.
- For maximum protein recovery, samples should have a molecular weight two-fold greater than the MWCO of the device membrane. A slightly reduced recovery can occur with molecules that are < 2-fold the MWCO of the membrane. Recovery varies depending on the specific protein and starting concentration. Example: When using IgG (MW~150K) samples, use the 5K, 10K, 30K, or 50K MWCO concentrators.
- The dead-stop volume for the 2–6 mL concentrators is approximately 30 µL.
- Precipitation can occur at high concentration factors for some proteins. The maximum concentration factor is dependent on the specific protein, starting concentration, and buffer system. Unless the stability of the protein has been determined, avoid concentrating to dead-stop.
- Do not autoclave the concentrators. High temperatures will significantly increase the membrane MWCO. To sterilize, use a 70% ethanol solution.
- The membrane is compatible with buffers at pH 1 to 9.
- The membrane is compatible with desalting and buffer exchange. The salt content can be reduced by ≥ 95% with one exchange as salts show minimal or no retention when they pass through the membrane. Buffer components larger than standard salt can require additional buffer exchange steps.
- For shortest concentration time we recommend using centrifuge setting near or at the maximum *g*-force recommended for a particular device and MWCO. For greater control of the concentration factor, reduce the centrifugation speed. For example concentration rates to achieve a desired volume for each MWCO, see Figure 1.

- Centrifugal force, temperature, sample volume, concentration, and viscosity affect filtration rate. Optimize centrifugal time for each application. Depending on conditions, centrifugation time to achieve desired result can differ significantly.

## Concentrate the sample without desalting

- Place sample into the Concentrator sample chamber.
- Cap, then place the Concentrator assembly into the rotor with a proper counterbalance.

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**IMPORTANT!** The counterbalance must be another Concentrator (not a filled conical tube) to ensure proper balance because of changing sample distribution during centrifugation.

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- Centrifuge the sample until the desired concentration factor is achieved.
- Use a pipet tip to gently aspirate the retentate from the bottom and center of the sample chamber.

## Concentrate the sample with desalting

- Place the sample into the Concentrator sample chamber.
- Cap, then place the Concentrator assembly into the rotor with a proper counterbalance.

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**IMPORTANT!** The counterbalance must be another Concentrator (not a filled conical tube) to ensure proper balance because of changing sample distribution during centrifugation.

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- Centrifuge the samples until the volume is reduced by 90–95%.
- Dilute the sample to the original volume with Exchange Buffer.
- Repeat steps 3 and 4 until the desired solute removal has been achieved.

**Note:** Precipitation can occur at high concentration factors for some proteins. If this occurs, reduce sample volume less in each step and increase the number of repeats.

## Troubleshooting

Observation	Possible cause	Recommended action
Protein precipitation.	Concentration was too high.	Reduce concentration factor.
		Try a different buffer system to increase protein solubility.
Low protein recovery.	The protein MW < two-fold higher than MWCO.	Select a new Concentrator with a MWCO at least 2-fold lower than the protein MW.
	The membrane was damaged and there is protein in the filtrate.	Use a new Concentrator and do not touch the membrane with the pipet tip.
		Do not exceed the recommended centrifugal force.

## Flux curves and recovery data

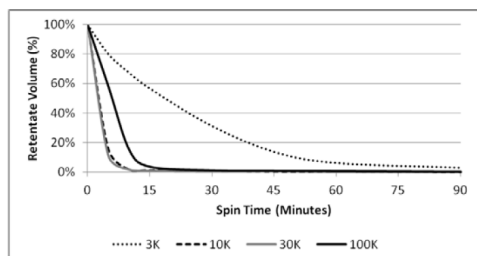


Figure 1 Protein concentration rates

Protein samples (6 mL of ~0.25 mg/mL starting concentrations) for each MWCO (3K, 10K, 30K, and 100K) were centrifuged in Pierce™ Protein Concentrators at  $4,000 \times g$  for 90 minutes to determine the rate at which the protein is concentrated. Within 15 minutes, the 10K, 30K, and 100K concentrators had concentrated > 90% of the protein solution. Within 90 minutes, the 3K concentrator had concentrated > 90% of the protein solution.

**Table 2** Protein recoveries using Pierce™ Protein Concentrators

Starting volume of 6 mL in a swinging-bucket rotor at  $4,000 \times g$  and 25°C.

Protein Sample	Membrane MWCO (kDa)	Centrifuge Time (minutes)	Protein Retentate	
			Volume ( $\mu$ L)	Recovery (%)
Cytochrome C, 12 kDa (0.25 mg/mL)	3	90	174	94
Ovalbumin, 45 kDa (0.25 mg/mL)	10	15	91	98
BSA, 66 kDa (0.25 mg/mL)	30	15	51	100
Thyroglobulin, 660 kDa (0.25 mg/mL)	100	15	212	97

## Chemical compatibility

The PES membranes used in the Pierce™ Protein Concentrators are compatible with most standard aqueous biological samples, buffers, and salts, according to the following table. Samples containing high levels of cell membranes, fats, or lipids can reduce performance and result in membrane blockage.

**Table 3** Concentrator chemical compatibility

Acids and Bases	Rating <sup>[1]</sup>	Organics	Rating <sup>[1]</sup>	Miscellaneous	Rating <sup>[1]</sup>
Acetic acid (25%)	A	Acetone	NR	Ammonium sulfate (saturated)	A
Formic acid (5%)	A	Acetonitrile	NR	Glycerine (70%)	A
Hydrochloric acid (1 M)	A	Benzene (100%)	NR	Guanidine HCl (6M)	A
Lactic acid (5%)	A	Chloroform (1%)	NR	Imidazole (300 mM)	A
Nitric acid (10%)	A	Dimethyl sulfoxide(5%)	A	Phosphate buffer (1.0 M)	A
Sodium hydroxide (2.5 M)	NR	Ethanol (70%)	A	Polyethylene glycol (10%)	A
Sulfamic acid (5%)	A	Ethyl Acetate (100%)	NR	Sodium carbonate (20%)	A
Trifluoroacetic acid (10%)	A	Formaldehyde (30%)	A	Sodium deoxycholate (5%)	A
		Hydrocarbons (aromatic)	NR	Sodium dodecylsulfate (0.1 M)	A
		Hydrocarbons (chlorinated)	NR	Sodium hypochlorite (200 ppm)	A
		Isopropanol (70%)	A	Sodium nitrate (1%)	A
		Mercaptoethanol (1.0 M)	NR	Tween™ 20-100 (0.1%)	A
		Pyridine (100%)	NR	Triton™ X-100 (0.1%)	A
		Tetrahydrofuran (5%)	NR	Urea (8 M)	A
		Toluene (1%)	NR		

<sup>[1]</sup> A = Acceptable, NR = Not Recommended

**Note:** Concentrations listed are provided as guidelines and do not necessarily represent maximum tolerances. Some compatible chemicals might modify the apparent molecular weight of molecules in the sample and/or the MWCO rating of the membrane.

## Related products

Product	Cat. No.	Capacity	Amount
Slide-A-Lyzer™ G2 Dialysis Cassettes, 2K MWCO	87717	0.5 mL	10 per pkg
Slide-A-Lyzer™ G2 Dialysis Cassettes, 3.5K MWCO	87722	0.5 mL	10 per pkg
Slide-A-Lyzer™ Dialysis Cassettes, 2K MWCO	66205	0.5 mL	10 per pkg
Slide-A-Lyzer™ Dialysis Cassettes, 3.5K MWCO	66333	0.5 mL	10 per pkg
Pierce™ Protein Concentrator, PES, 3K MWCO	88512	100–500 µL	25 per pkg
Pierce™ Protein Concentrator, PES, 10K MWCO	88513	100–500 µL	25 per pkg
Pierce™ Protein Concentrator, PES, 30K MWCO	88502	100–500 µL	25 per pkg
Pierce™ Protein Concentrator, PES, 50K MWCO	88504	100–500 µL	25 per pkg
Pierce™ Protein Concentrator, PES, 100K MWCO	88503	100–500 µL	25 per pkg
Pierce™ Protein Concentrator, PES, 3K MWCO	88525	5–20 mL	10 per pkg
	88526	5–20 mL	24 per pkg
Pierce™ Protein Concentrator, PES, 10K MWCO	88527	5–20 mL	10 per pkg
	88528	5–20 mL	24 per pkg
Pierce™ Protein Concentrator, PES, 30K MWCO	88529	5–20 mL	10 per pkg
	88531	5–20 mL	24 per pkg
Pierce™ Protein Concentrator, PES, 50K MWCO	88540	5–20 mL	10 per pkg
	88541	5–20 mL	24 per pkg
Pierce™ Protein Concentrator, PES, 100K MWCO	88532	5–20 mL	10 per pkg
	88533	5–20 mL	24 per pkg
Pierce™ Protein Concentrator, PES, 5K MWCO	88534	20–100 mL	4 per pkg
Pierce™ Protein Concentrator, PES, 10K MWCO	88535	20–100 mL	4 per pkg
Pierce™ Protein Concentrator, PES, 30K MWCO	88536	20–100 mL	4 per pkg
Pierce™ Protein Concentrator, PES, 50K MWCO	88542	20–100 mL	4 per pkg
Pierce™ Protein Concentrator, PES, 100K MWCO	88537	20–100 mL	4 per pkg
Pierce™ BCA Protein Assay Kit	23225	—	—

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**Revision history:** Pub. No. MAN0015695

Revision	Date	Description
B.0	17 January 2019	Rebranding of document.

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