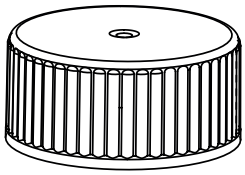
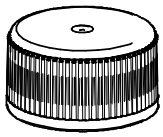
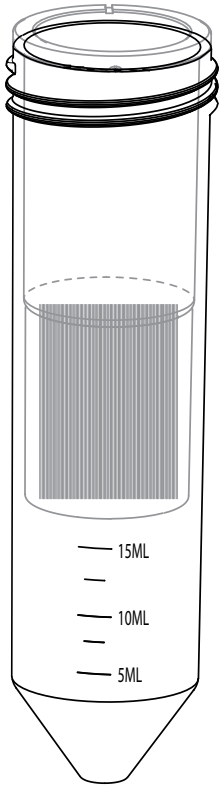
# Manual

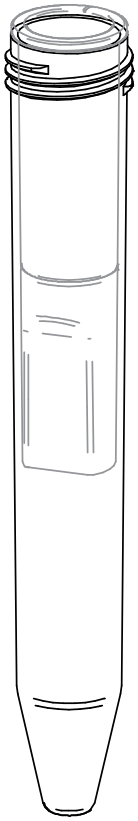
## FastGene® UF Concentrators

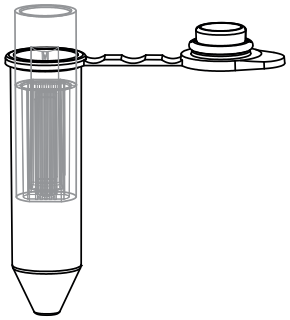
FG-UFC05-10KD
FG-UFC05-30KD
FG-UFC05-100KD
FG-UFC4-10KD
FG-UFC4-30KD
FG-UFC4-100KD
FG-UFC15-10KD
FG-UFC15-30KD
FG-UFC15-100KD









# 1. General information

## 1.1 Product details

The FastGene® UF Concentrators are designed for rapid concentration, purification, and buffer exchange of proteins, nucleic acids, and other biomolecules.

Available in 0.5 mL, 4 mL, and 15 mL sample size tubes, with multiple molecular weight cut-offs (MWCO: 10 kDa, 30 kDa, 100 kDa), they ensure excellent sample recovery with minimal binding. The vertical dual-membrane design prevents clogging and enables fast flow rates, while the anti-dry lock system protects sensitive samples from over-centrifugation. With low-binding PES membranes, the FastGene® UF Concentrators deliver excellent biocompatibility and reproducibility for research applications.

## 1.2 Features

- Very high sample recovery rate (>90%)
- Minimal protein and nucleic acid adsorption
- Vertical design for fast, clog-free filtration/concentration
- Ultra-low dead volume for maximum yield
- Compatible with standard centrifuge rotors
- Safe, reliable materials

## 1.3 Applications

- Protein and nucleic acid concentration or desalting
- Buffer exchange
- Virus and exosome concentration
- Removal of contaminants from cell lysates
- Clarification of samples prior to chromatography or HPLC

## 1.4 Technical specifications

| Parameter | 0.5 mL UF Conc. | 4 mL UF Conc. | 15 mL UF Conc. |
|---|---|---|---|
| Centrifuge tube size | 1.5/2 mL conical tubes | 15 mL conical tubes | 50 mL conical tubes |
| Membrane material | PES (polyethersulfone) | | |
| Tube and cap material | PP (polypropylene) | | |
| Filter Device Material | PC (polycarbonate)<br>K-resin (Styrene-butadiene Copolymer) | | |
| Dead volume | ≤5 µL | ≤20 µL | ≤30 µL |
| Lock volume (min.) | 10–20 µL | 50–100 µL | ~300 µL |
| Max. RCF<br>(Fixed-angle rotor) | 14,000 × g | 6,000 × g | 5,000 × g<br>(3,000 × g for 100 kDa) |
| Max. RCF<br>(Swing-out rotor) | 14,000 × g | 4,000 × g | 4,000 × g<br>(3,000 × g for 100 kDa) |
| Operating temp. | 0–40 °C | | |
| pH range | 1–14 | | |
| Sterilization | Not autoclavable. Sterilize by flushing with 70% ethanol through the UF Concentrator. | | |

## 1.5 Order numbers

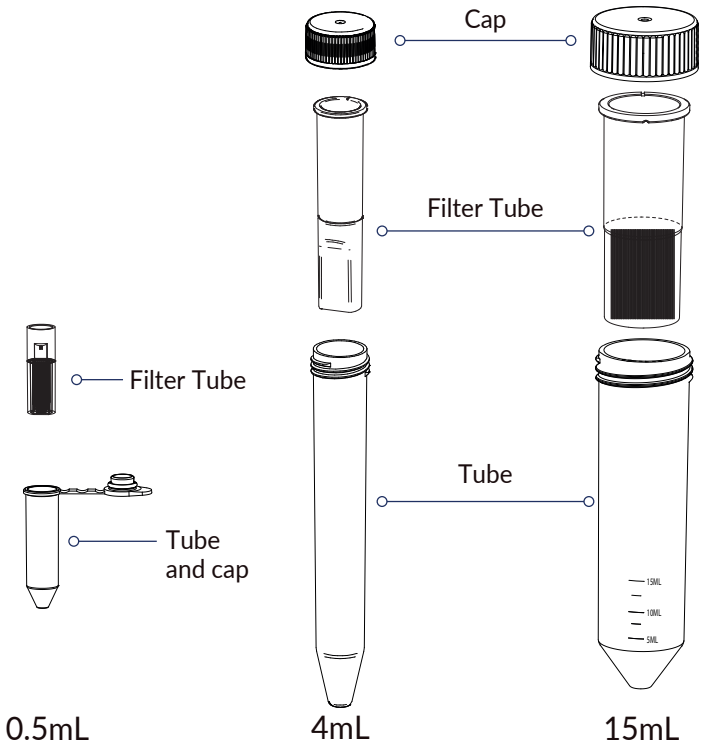
| Cat. No. | Volume | MWCO | Cap Colour | Package Size (pc/box) |
|---|---|---|---|---|
| FG-UFC05-10KD | 0.5 mL | 10 kDa | transparent | 96 |
| FG-UFC05-30KD | 0.5 mL | 30 kDa | transparent | 96 |
| FG-UFC05-100KD | 0.5 mL | 100 kDa | transparent | 96 |
| FG-UFC4-10KD | 4 mL | 10 kDa | yellow | 40 |
| FG-UFC4-30KD | 4 mL | 30 kDa | green | 40 |
| FG-UFC4-100KD | 4 mL | 100 kDa | pink | 40 |
| FG-UFC15-10KD | 15 mL | 10 kDa | yellow | 15 |
| FG-UFC15-30KD | 15 mL | 30 kDa | green | 15 |
| FG-UFC15-100KD | 15 mL | 100 kDa | pink | 15 |

# 2. Operation instructions

### 2.1 FastGene® UF Concentrator structure

Each concentrator consists of:

- Cap – prevents evaporation during centrifugation
- Filter tube (inner tube) – contains the PES ultrafiltration membrane
- Collection tube (outer tube) – collects filtrate



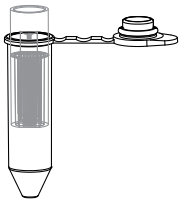

### 2.2 Pre-rinse procedure

Before use, remove preservatives (glycerol traces) from the membrane:

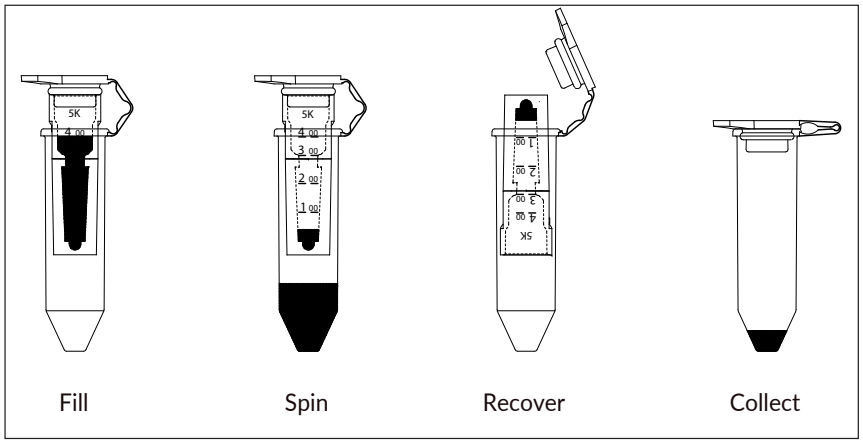
1. Fill the filter tube with deionized water or buffer
   - 0.5 mL tube → 0.5 mL
   - 4 mL tube → 4 mL
   - 15 mL tube → 15 mL
2. Centrifuge and discard the filtrate.
3. Repeat once.
4. For highly sensitive experiments, an additional rinse with 0.05 M NaOH may be used.

Important: Once wetted, the filter should remain moist until use.

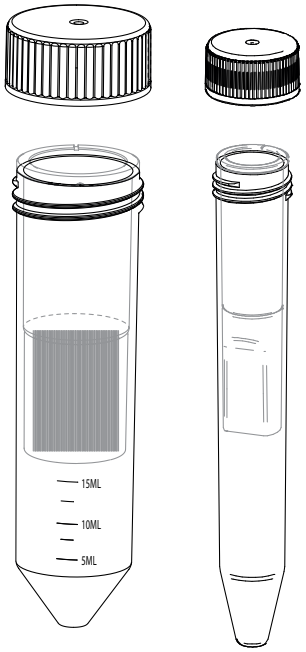
## 2.3 Operation of 0.5 mL UF Concentrators



1. Load ≤0.5 mL sample into the filter device and cap it.
2. Centrifuge at up to 14,000 × g (10–30 min). Always balance the rotor.
3. For recovery: invert the inner tube into a new collection tube and centrifuge at 1,000 × g for 1–2 min.
4. Collect both filtrate and concentrate if required.




## 2.4 Operation of 4 mL and 15 mL UF Concentrators




1. Load sample:
   - 4 mL tube → max. 4.5 mL
   - 15 mL tube → max. 15 mL
2. Place into centrifuge compatible with 15/50 mL conical tubes.
3. Centrifuge according to MWCO:
   - 4 mL: 1,000–6,000 × g (max 3,000 × g for 100 kDa)
   - 15 mL: 1,000–5,000 × g (max 3,000 × g for 100 kDa)
   - Typical spin time: 10–30 min.
4. Recover concentrate with a pipette from the filter bottom.

## 2.5 Performance

Retention:

- Defined by MWCO (10 kDa, 30 kDa, 100 kDa).
- Molecules close to MWCO may be only partially retained.
- Recommendation: Choose an MWCO ~2-3× smaller than the molecular weight of the target.

Recovery:

- Typical recovery: >90% for proteins and nucleic acids.

Table 1: Ultrafiltration performance of protein solutions (1 mg/mL) at recommended centrifugal forces (see 1.4 Technical specifications). Recovery values represent average performance for FastGene® UF Concentrators under standard laboratory conditions.

| Protein | Molecular Weight (Da) | UF Conc. MWCO | Retention Rate | Centrifugation Time (min) 15 mL / 4 mL Tubes | Centrifugation Time (min) 0.5 mL Tubes |
|---|---|---|---|---|---|
| **Ovalbumin (OVA)** | 45 000 | 10 kDa | > 95 % | 15 – 30 | 10 – 15 |
| **Bovine Serum Albumin (BSA)** | 67 000 | 30 kDa | > 95 % | 15 – 20 | < 10 |
| **Immunoglobulin G (IgG)** | 156 000 | 100 kDa | > 90 % | 20 – 30 | < 10 |

## 2.6 FastGene® UF Concentrator - MWCO selection guide

Table 2: MWCO selection guide. Choosing the correct MWCO (Molecular Weight Cut-Off) is essential for optimal recovery and concentration efficiency. Use smaller MWCO filters for smaller proteins and larger MWCO filters for high-molecular-weight biomolecules such as antibodies, viruses, or exosomes.

| MWCO Filter Membrane | Recommended Protein Molecular Weight Range | Centrifugation Time (min) 0.5 mL Tubes | Centrifugation Time (min) 4 mL Tubes | Centrifugation Time (min) 15 mL Tubes |
|---|---|---|---|---|
| **10 kDa** | ~20 – 60 kDa | 10 – 15 min | 15 – 30 min | 15 – 30 min |
| **30 kDa** | ~60 – 120 kDa | < 10 min | 15 – 20 min | 15 – 20 min |
| **100 kDa** | ≥ 150 kDa (large proteins, antibodies, viruses, exosomes) | < 10 min | 20 – 30 min | 20 – 30 min |

## 2.7 Chemical compatibility

FastGene® UF Concentrators are appropriate for biological liquids and aqueous solution. Please verify the chemical compatibility of the specific sample with the UF Concentrators before use to prevent device failure.

Table 3: Chemical compaibility of FastGene® UF Concentrator tubes.

| Category | Chemical / Reagent | Maximum Concentration |
|---|---|---|
| Acids | Sulfamic acid | ≤3 % |
| | Formic acid | ≤5 % |
| | Acetic acid | ≤25 % |
| | Hydrochloric acid | ≤1 M |
| | Sulfuric acid | ≤3 % |
| | Nitric acid | ≤10 % |
| | Lactic acid | ≤5 % |
| | Phosphoric acid | ≤30 % |
| | Trifluoroacetic acid | ≤10 % |
| | Trichloroacetic acid | ≤10 % |
| Bases | Sodium hydroxide (4 mL / 15 mL tubes) | ≤0.5 M |
| | Sodium hydroxide (0.5 mL tubes) | ≤0.1 M |
| | Ammonium hydroxide | ≤10 % |
| Alcohols | Methanol | ≤60 % |
| | Ethanol | ≤70 % |
| | Isopropanol | ≤70 % |
| | n-Butanol | ≤70 % |

| Category | Chemical / Reagent | Maximum Concentration |
|---|---|---|
| Organic solvents | Benzene | Not recommended |
| | Acetone | Not recommended |
| | Acetonitrile | ≤10 % |
| | Toluene | Not recommended |
| | Formaldehyde | ≤5 % |
| | DMSO | ≤5 % |
| | Ethyl acetate | Not recommended |
| | Pyridine | Not recommended |
| | Chloroform | Not recommended |
| | Carbon tetrachloride | Not recommended |
| | Tetrahydrofuran | Not recommended |
| Other reagents | Phenol | < 1 % |
| | Glycerol | ≤70 % |
| | DTT | ≤0.1 M |
| | DEPC (Diethyl pyrocarbonate) | ≤0.2 % |
| | PEG (Polyethylene glycol) | ≤10 % |
| | Phosphate buffer (pH 8.2) | ≤1 M |
| | Ammonium sulfate | Saturated |
| | Imidazole | ≤500 mM |
| | Urea | ≤8 M |
| | β-Mercaptoethanol | ≤0.01 M |
| | Tris buffer (pH 8.2) | ≤1 M |
| | Sodium carbonate | ≤20 % |
| | Guanidine hydrochloride | ≤6 M |

## 2.8 Non-specific adsorption

- PES membranes have very low binding.
- Hydrophobic proteins may adsorb; this can be reduced by pre-blocking with 10% glycerol overnight, followed by rinsing.

### 2.9 Desalting / Diafiltration

1. Concentrate sample 10×.
2. Dilute with exchange buffer.
3. Repeat 3–5 cycles to remove 95–99% salts.

### 2.10 Precautions

- For research use only (not diagnostic).
- Do not exceed maximum loading volume.
- Avoid prolonged centrifugation to reduce recovery loss.
- Always balance tubes properly in centrifuge.
- Do not autoclave.
- Check chemical compatibility before use.

## 3. FAQs

**What are FastGene® UF Concentrators used for?**
They are used for concentration, desalting, and buffer exchange of biomolecules such as proteins, nucleic acids, and viruses. They can also be used to clarify samples or remove small contaminants.

**What sizes and MWCOs are available?**
FastGene® UF Concentrators are offered in three sizes – 0.5 mL, 4 mL, and 15 mL – each in three molecular weight cut-offs (MWCO): 10 kDa, 30 kDa, and 100 kDa.

**What membrane material is used?**
All FastGene® UF Concentrators use a low-binding PES (Polyethersulfone) membrane, ideal for proteins and nucleic acids.

**What pH range can they handle?**
The PES membrane is compatible with pH 1–14, covering most biological and chemical applications.

**Can I reuse the concentrators?**
All FastGene® UF Concentrators are single-use, non-sterile devices. Reuse may reduce performance and risk contamination. Reuse is not recommended.

**Can they be sterilized?**
Do not autoclave. For cleaning or limited sterilization, you may rinse with 70 % ethanol for 30 minutes before use. Always let ethanol evaporate completely.

**Are the concentrators RNase- or endotoxin-free?**
They are not certified RNase-free or endotoxin-free. If required, rinse with 0.1 % DEPC solution at 37 °C for 2 h and then wash thoroughly with ultrapure water.

**Can I use them at 4 °C?**
Yes. Centrifugation at 4 °C is possible, but viscosity increases at low temperature, so extend the spin time by about 1.5 ×.

**How do I collect the concentrated sample?**

- 0.5 mL tubes: Use the reverse-spin method – invert the filter into a clean collection tube and centrifuge at 1,000 × g for 1–2 min.
- 4 mL and 15 mL tubes: Collect the concentrate directly with a pipette.

**How can I improve protein recovery or avoid loss?**

- Choose an MWCO about one-third of the target protein's molecular weight.
- Avoid excessive centrifugal force or long spin times.
- If the sample is viscous or prone to sticking, pre-block the membrane with 10 % glycerol overnight and rinse before use.

**My protein precipitated during concentration — what should I do?**
Precipitation can occur when concentrating too quickly or too far.
Try:

- Reducing centrifugal force (to 30–50 % of the recommendation).
- Switching to a larger MWCO (e.g., 30 kDa instead of 10 kDa).
- Gently mixing the sample between spins.

**Why is my target protein missing after centrifugation?**
Possible causes:

- The MWCO chosen is too large (target passed through).
- Centrifugal force too high or rotor not calibrated.
- Protein precipitated during spin. Check filtrate and concentrate; if protein is in filtrate, use a smaller MWCO.

**Can these devices remove detergents or endotoxins?**

- Detergents: Only partially; efficiency drops above the CMC value.
- Endotoxins: No, as endotoxins are often >10 kDa and not removed effectively by ultrafiltration.

**Can FastGene® UF Concentrators be used for virus or nanoparticle concentration?**
Yes.

- Lentivirus: Use 100 kDa MWCO.
- Adenovirus: Use 30 kDa MWCO.

They are also suitable for nanoparticle and exosome concentration (recommended 30–100 kDa).

**What centrifuge settings should I use?**
Use swing-bucket or fixed-angle rotors compatible with standard conical tubes. Always balance your samples.

| Parameter | 0.5 mL UF Conc. | 4 mL UF Conc. | 15 mL UF Conc. |
|---|---|---|---|
| **Max. RCF (Fixed-angle rotor)** | 14,000 × g | 6,000 × g | 5,000 × g (3,000 × g for 100 kDa) |
| **Max. RCF (Swing-out rotor)** | 14,000 × g | 4,000 × g | 4,000 × g (3,000 × g for 100 kDa) |

**Do samples dry out during centrifugation?**
No. The FastGene® UF Concentrators feature a dead-volume design that prevents complete drying and protects your sample.

**Are the devices chemically compatible with organic solvents or strong reagents?**
They are intended for aqueous and biological solutions.
Check the chemical compatibility table before using acids, bases, or solvents.

**How can I reduce non-specific adsorption of my protein to the membrane?**
FastGene® UF Concentrators use low-binding PES membranes, but some hydrophobic or non-polar proteins may still show slight adsorption. To minimize this effect:

- Pre-block the membrane before use (for example, with 10 % glycerol or a similar blocking solution), then rinse with buffer or water.
- Avoid excessive membrane surface area when working with very small sample volumes.

If adsorption persists, please contact FastGene® Technical Support for detailed pre-treatment instructions.



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