



## Tangential Flow Filtration Portfolio

TFF Cassettes | TFF Systems |  
Hollow Fiber Modules

Simplifying Progress

**SARTORIUS**

# Tangential Flow Filtration Overview

Sartorius offers solutions for the biopharmaceutical industry and laboratories, from drug discovery and development to production platforms for biomanufacturing.

The Sartorius products are excellent for a variety of protein-based applications such as:

- Purification of mAbs, ADC and vaccines
- Oligonucleotides and peptides
- DNA and protein concentration
- Desalination
- Adjusting buffer conditions

Tangential Flow Filtration enables separation and concentration of biomolecules in a gentle and efficient way.

## Features and Benefits

- **Distinctive:** Unique portfolio able to meet range of process requirements
- **Scalable:** Different options are available to meet your process needs
- **Diversity:** Single-use and multi-use formats suitable for process development, pilot and commercial scale operations
- **Data:** Usage and chemical compatibility available
- **Easy of Use:** Proven, reliable and well-known design
- **Support:** Local field application specialists and service engineer on-site support available



# TFF Consumables

## Cassettes, Hollow Fiber

Sartorius offers TFF Cassettes, Hollow Fiber modules and the fitting systems. Within this portfolio there are many configurations available. There is the right combination for every filtration need.



## How to Choose Between Cassettes or Hollow Fiber?

### Flux Driven

- Proteins
- mAbs
- Non-enveloped viruses (AAV, adenovirus)
- ADC

**Evaluate Cassettes First**

→ Highest flow rate  
(and high recovery)

- mRNA, pDNA
- SC IVIG

**Evaluate Both**

Find best compromise between flux and recovery.  
→ Consider chemical compatibility

### Recovery Driven

- Lentiviruses, MVA, Vaccinia, big enveloped viruses
- Exosomes, LNP
- Large pDNA

**Evaluate Hollow Fiber First**

→ Highest recovery

# Cassettes

## Sartocon® Cassettes

- High mass transfer at low feed flow rate and high product recovery
- Broad pH and temperature range for a wide choice of sanitizing agents
- Self-sealing cassette design with no gaskets needed
- Silicone sealing compound ensures low extractables
- Enlarged feed and retentate ports provide a lower pressure drop for increased efficiency

## Sizes

From the Sartocon® Slice 50 with a filtration area of 0.005 m<sup>2</sup> to the Sartocube® with a filtration area of 3.5 m<sup>2</sup>, Sartorius offers many cassettes which are easily scalable.

Each size is also available with a MWCO between 1 kDa and 300 kDa. The ECO-Screen is ideal for low protein-concentration or high viscosity.

## Membranes (incl. Cutoff)

Two different Membranes:

- Polyethersulfone (PESU): low adsorption and protein-binding, economical filtrations runs, used in blood and plasma, enzymes, conventional vaccines.
- Hydrosart®: non-absorptive and non-protein binding, easily cleanable, no loss of proteins, used in: mAbs, mRNA, ADC, recombinant proteins, Oligo and Nucleotides, AAV, LVV, AV, Cell Therapy.

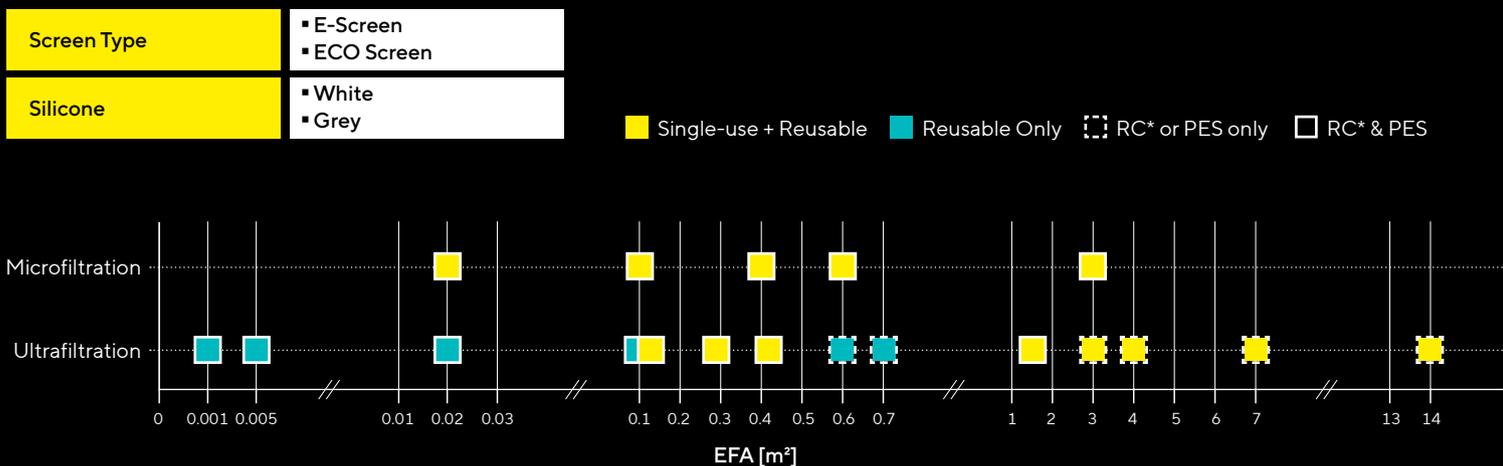
## Self-Contained Unit (SCU)

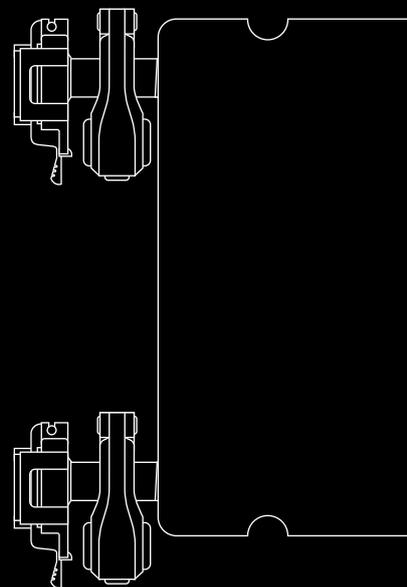
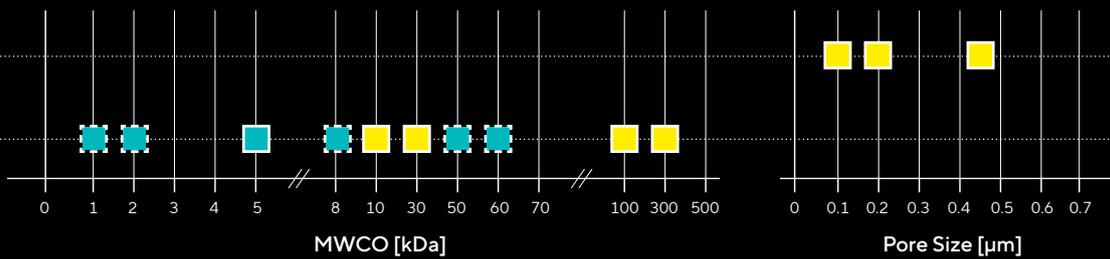
The Self-Contained Units are already gamma irradiated. The use of a SCU offers several advantages such as being pre-flushed, sterile, and ready to use. Additionally, there is no need for cleaning in place (CPI) with associated water flush and validation, which leads to cost and time savings in set up and validation efforts.

## Sartocon® Single Pass

The concentration and buffer exchange at the same time allow continuous processing, higher productivity and efficiency, less buffer usage, and decreased setup time. No recirculation results in less shear. In addition, single pass cassettes have a smaller footprint.

## Product Landscape TFF Cosumables – Ultrafiltration & Microfiltration







# Hollow Fiber

## Cut-Offs and Fiber Diameter

- MWCO: 3 – 750 kDa for ultrafiltration and 0.1–0.45  $\mu\text{m}$  for microfiltration
- Fiber diameter: 0.5–1 mm

## Scalability

- 52  $\text{cm}^2$  – 15.45  $\text{m}^2$  filtration area
- 10 mL – 1,500 L process volume

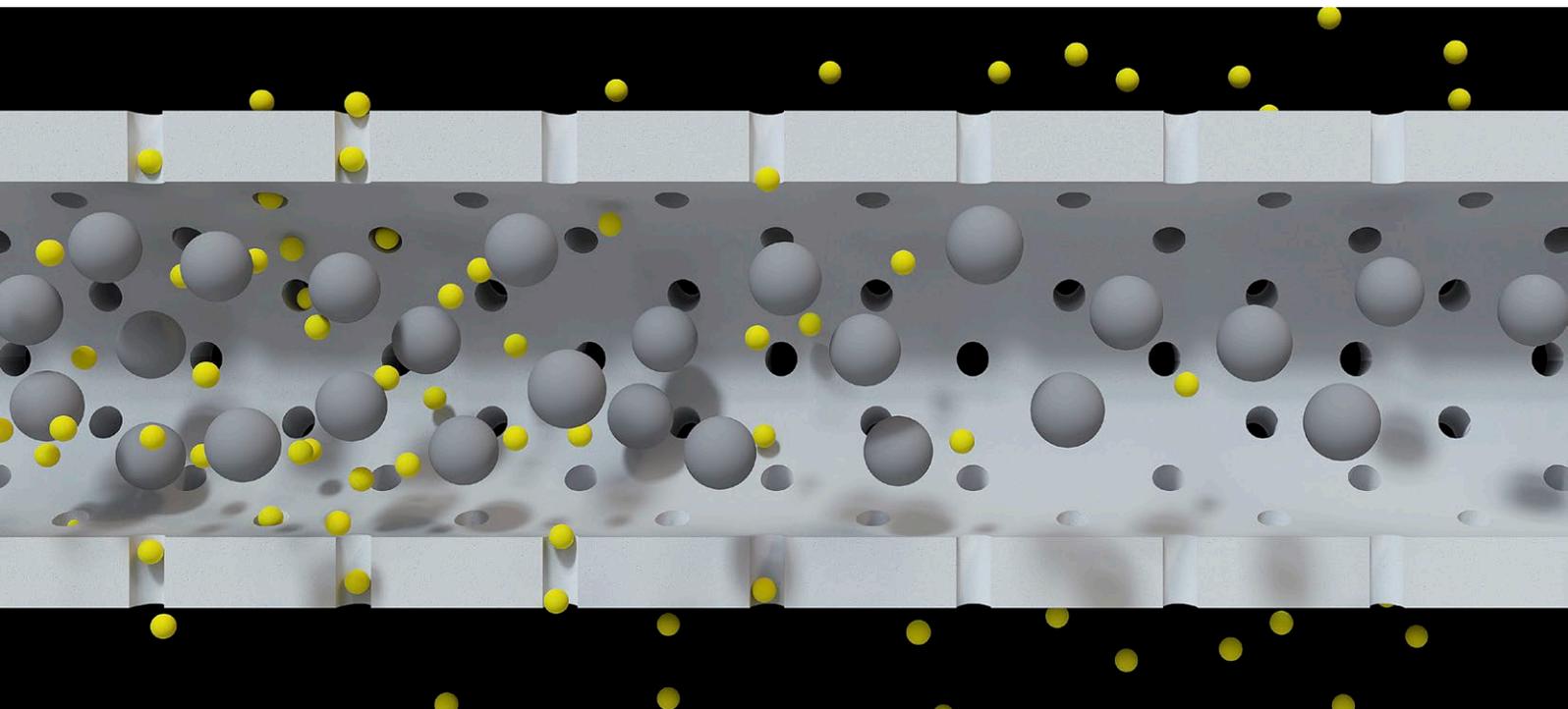
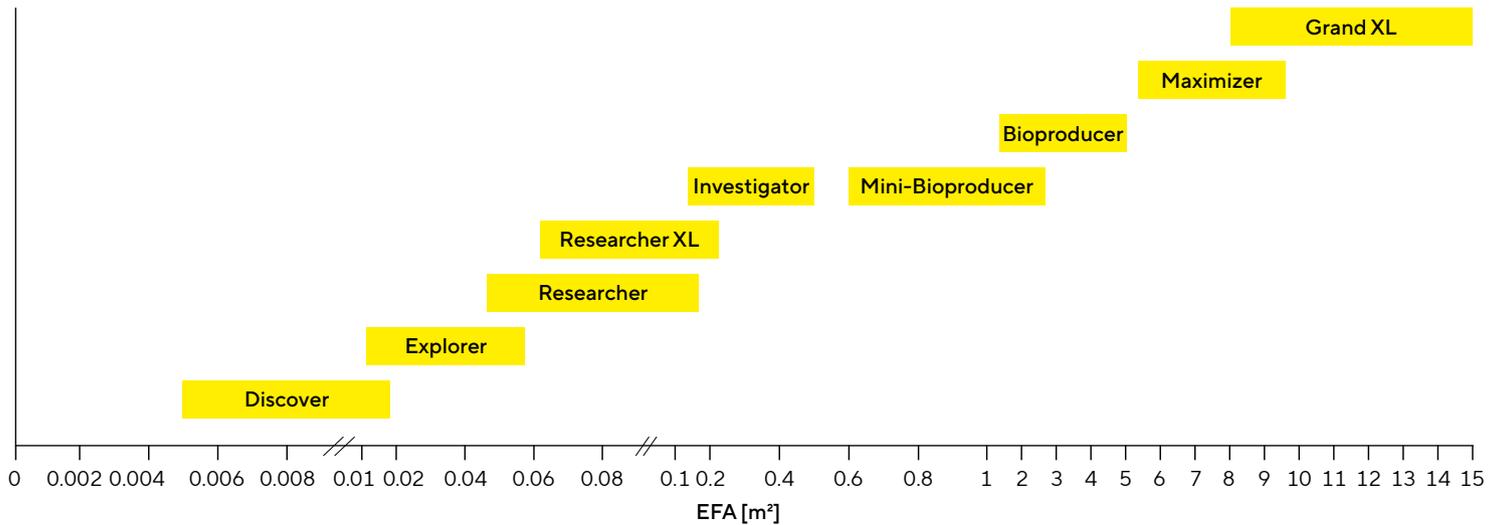
## Compatibility

- Sartoflow® 1000 and Sartoflow® 4500

## Product Lines

- All lines are gamma-irradiated
- Single-Use Line: fully integrity tested and ready to use
- Steamer Line: autoclavable up to 5 times
- Re-use line: can be easily cleaned and stored in NaOH

## TFF Hollow Fiber – Ultrafiltration & Microfiltration



# Sartoflow® Systems

Sartorius offers flexible tangential flow filtration (TFF) systems for process development and clinical trials, from laboratory environments up to commercial production batches.

The TFF portfolio can flex to accommodate different process requirements, with options that include cost efficient multi-use systems or closed systems with single-use flow kits for aseptic processing.

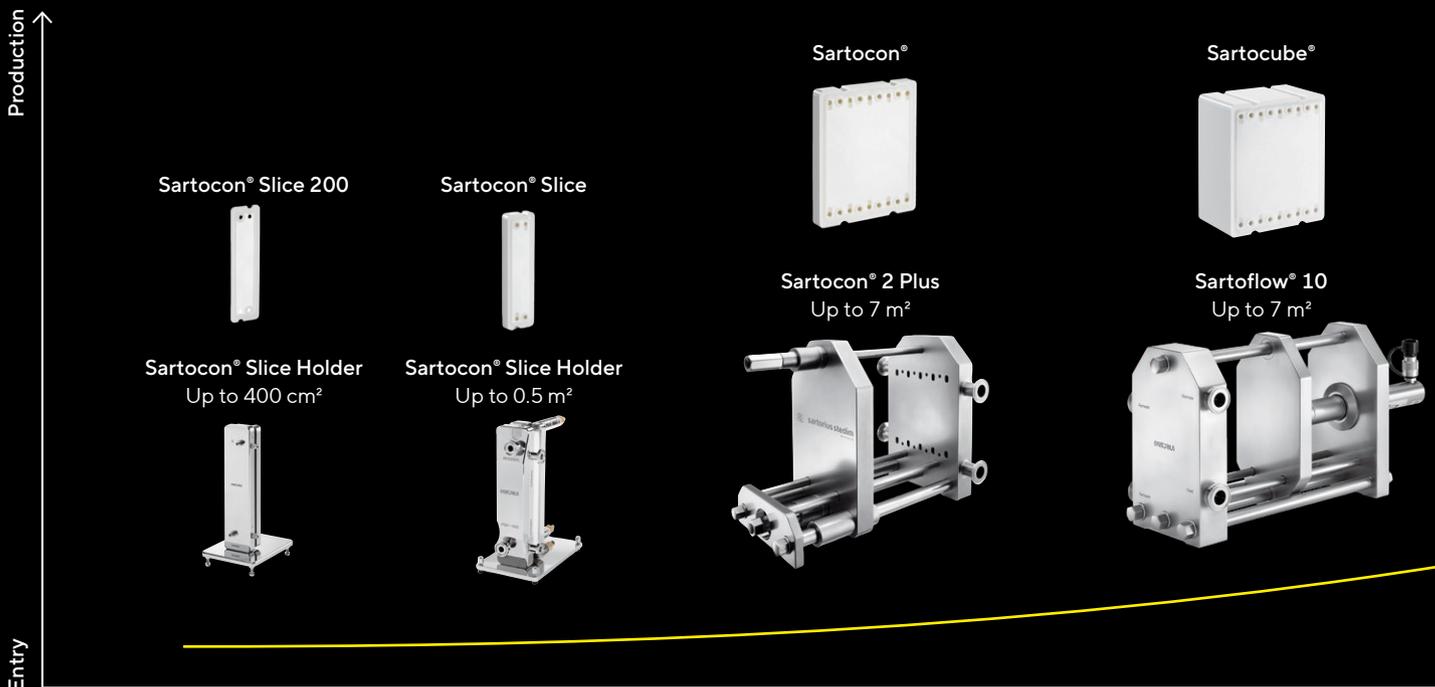
## Data

- Filter surface area: 50 cm<sup>2</sup> – 10 m<sup>2</sup>
- Good Laboratory Practice (GLP) and cGMP systems
- R&D, PD, Pilot scale and commercial scale
- Flow rate: 1 L/h – 4,500 L/h
- Range of sensors (e.g. pressure, conductivity, pH, UV)
- Touchscreen-based process visualization, monitoring, and control software
- Scalable Process Holders
- Manual, semi-automated, or fully automated

## Compatibility

The combination of Sartorius TFF cassettes with Sartorius TFF systems provides an optimal TFF experience. With the scalable TFF system portfolio Sartorius can support the range of cassette types dedicated to your needs.

The Hollow Fiber modules are only suitable for the Sartoflow® 1000 and Sartoflow® 4500.



# Technical Detail and Efficient Scale-up With Sartorius TFF Filter Holders

## Product Development

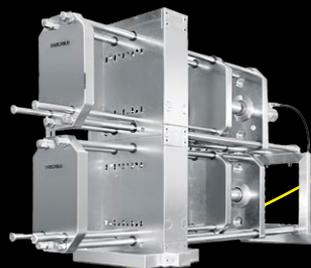
## Commercial Production



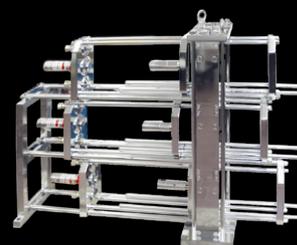
Attributes	Ambr® Crossflow	Sartoflow® Smart	Sartoflow® SP	Sartoflow® Advanced	Sartoflow® Expert SU	Sartoflow® 1000	Sartoflow® 4500
Process mode (multi   single)	Multi-use   Single-use	Multi-use	Multi-use	Multi-use	Single-use	Single-use	Single-use
Membrane area flatsheet cassette	Ambr® CF Filter Sartocon® Slice 50 10 cm <sup>2</sup> and 50 cm <sup>2</sup>	Sartocon® Slice 50 Sartocon® Slice 200 50 cm <sup>2</sup> –0.14 m <sup>2</sup>	Sartocon® SP 0.2 m <sup>2</sup>	Sartocon® Slice Sartocon® 0.7–2.1 m <sup>2</sup>	Sartocon® Slice SC Sartocube® SC Sartocon® 0.1–1.4 m <sup>2</sup>	Sartocon® 0.6–2.8 m <sup>2</sup>	Sartocon® Sartocube® 3–10 m <sup>2</sup>
Membrane area hollow fiber*	Hollow fiber type	Not available	Not available	Not available	Not available	Investigator Mini-Bioproducer 0.13–2.5 m <sup>2</sup>	Bioproducer 2.69–5 m <sup>2</sup>
Vessel volume	100 mL	1 L	Not applicable	10 L	20 L mixing	10, 20, 100 L	-
Flow rate   pump capacity	0–4.8 L/hr	1–100 L/hr	Buffer: 11.6 L/hr @2 bar (29 psi) Feed: 3.4 L/hr @2 bar	42 L/hr	1,000 L/hr	900 L/hr	4,500 L/hr
Minimum recirculation volume	5 mL	<20 mL	Not applicable	200mL	600 mL	1.2 L	Customizable
Automation level	Full	Semi	Full	Full	Full	Full	Full



Sartoflow® 20  
Up to 14 m<sup>2</sup>



Sartoflow® 40  
Up to 28 m<sup>2</sup>



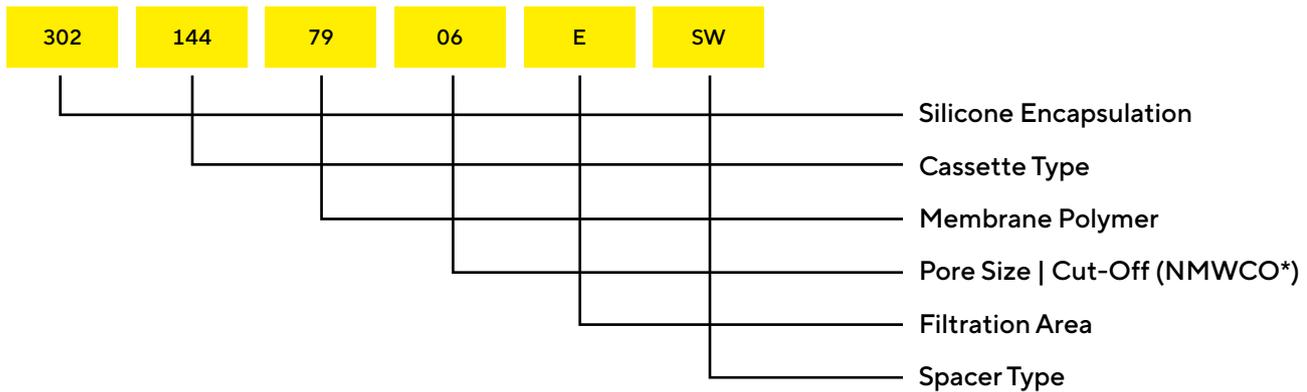
Sartoflow® 60  
Up to 42 m<sup>2</sup>



Sartoflow® 80  
Up to 56 m<sup>2</sup>

Process Volume →

# How to Order



## Silicone Encapsulation

- SG Grey
- SW White Sartocube®
- BSW White Sartocube®

## Cassette Type

- 302** Sartocube®
- 302** Sartocube®
- 305** Sartocube® Slice
- 306** Sartocube® Slice Disposable
- 308** Sartocube® Slice 200
- 3M2** Sartocube® ECO
- 3M2** Sartocube® ECO
- 3M5** Sartocube® Slice ECO
- 3M8** Sartocube® Slice 200 ECO

## Membrane

- 144** Hydrosart® (2 | 5 | 10 | 30 | 100 | 300 kDa)
- 146** Polyethersulfone (moderate binding)  
(1 | 5 | 8 | 10 | 30 | 50 | 100 | 300 kDa | AL)
- 154** Polyethersulfone (0.1 µm)
- 175** Polypropylene (0.2 µm)
- 186** Hydrosart® (0.2 | 0.45 µm)

## Pore Size | Cut-Off

- AL** PESU Max for Albumin
- 06** 0.45 µm
- 07** 0.2 µm
- 58** 0.1 µm
- 79** 300 kDa
- 68** 100 kDa
- 50** 50 kDa
- 59** 30 kDa
- 39** 10 kDa
- 34** 8 kDa
- 29** 5 kDa
- 19** 2 kDa
- 09** 1 kDa

## Filtration Area

- 02** 0.02 m<sup>2</sup> Sartocube® Slice 200 (UF, MF)
- 01** 0.1 m<sup>2</sup> Sartocube® Slice (UF, MF)
- 04** 0.4 m<sup>2</sup> Sartocube® (MF open channel)
- 06** 0.6 m<sup>2</sup> Sartocube® (Hydrosart® UF, MF wide spacer)
- 07** 0.7 m<sup>2</sup> Sartocube® (PESU UF)
- 30** 3.0 m<sup>2</sup> Sartocube® (Hydrosart® UF)
- 35** 3.5 m<sup>2</sup> Sartocube® (PESU UF)

## Spacer Type

- E** Narrow spacer (E-Screen | ECO)
- K** PESU Max
- O** Open Channel (MF)
- W** Wide Spacer (MF)

\*NMWCO: nominal molecular weight cutoff

General overview of the structure behind the order codes of our TFF cassette portfolio.

Note, that not all combinations are available.

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Specifications subject to change without notice.

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