

**Millipore®**

# Installation and User Guide

**Pellicon® Single-Pass TFF Accessories**

The life science business of Merck  
KGaA, Darmstadt, Germany  
operates as MilliporeSigma in the  
U.S. and Canada.





# Contents

Introduction.....	5
Catalog Numbers .....	5
Pellicon® Single-Pass TFF Installation.....	6
Pellicon® 2 Mini Cassette Installation.....	6
Pellicon® 2 Cassette Installation .....	9
Pellicon® 3 88 cm <sup>2</sup> or 0.11 m <sup>2</sup> Cassette Installation .....	12
Pellicon® 3 0.57 m <sup>2</sup> or 1.14 m <sup>2</sup> Cassette Installation.....	15
Flushing and Cleaning .....	18
Flushing.....	18
Cleaning .....	19
Sanitization .....	20
Depyrogenation.....	21
Integrity Testing .....	22
Measurement of Normalized Water Permeability (NWP).....	24
Storage.....	27
Storing the Filters in the System .....	27
Storing the Filters without the System .....	27
Standard Product Warranty .....	28



## Introduction

This guide provides installation and maintenance procedures for the Pellicon® Cassette Single-Pass TFF Accessories. It is not intended to provide validation protocols or supporting data for validation purposes. Refer to the appropriate Pellicon® Cassette Validation Guide for this information. Refer to the Certificate of Quality supplied with each Pellicon® cassette or hardware for specifications. Refer to the appropriate cassette user guide for additional information on installation and use.

The Pellicon® Cassette Single-Pass TFF Accessories must be installed in the appropriate Pellicon® Cassette holder.

For supporting information on cassette installations, refer to the following:

- *Pellicon® 2 Cassettes Maintenance, Installation and User Guide*
- *Pellicon® 3 Cassettes Installation and User Guide*
- *Torque and Compression Force of Pellicon® 2 and 3 Cassettes*

## Catalog Numbers

This user guide supports the following catalog numbers.

Catalog Number	Description	Cassette Size
XXSPTFF01	Pellicon® Single-Pass TFF Mini Kit Includes four diverter plates and two silicone gaskets	Pellicon® 3 88 cm <sup>2</sup> and 0.11 m <sup>2</sup>
		Pellicon® 2 0.1 m <sup>2</sup>
XXSPTFF02	Pellicon® Single-Pass TFF cassette diverter plate	Pellicon® 3 0.57 m <sup>2</sup> and 1.14 m <sup>2</sup>
		Pellicon® 2 0.5 m <sup>2</sup>
XXSPTFF03	Pellicon® Single-Pass TFF cassette retentate collection plate	Pellicon® 3 0.57 m <sup>2</sup> and 1.14 m <sup>2</sup>
		Pellicon® 2 0.5 m <sup>2</sup>

# Pellicon® Single-Pass TFF Installation

## Pellicon® 2 Mini Cassette Installation

### Required Equipment

Items listed in this table are required for a three-section single-pass TFF installation with Pellicon® 2 Mini Cassettes. Sections may be added or removed as needed for each specific application.

Item Description	Quantity
Pellicon® Single-Pass TFF Mini Kit (includes four diverter plates and two silicone gaskets)	1
Pellicon® 2 Mini Cassette (includes two silicone gaskets)	3
Pellicon® Mini holder with extended tie rods	1

### NOTES

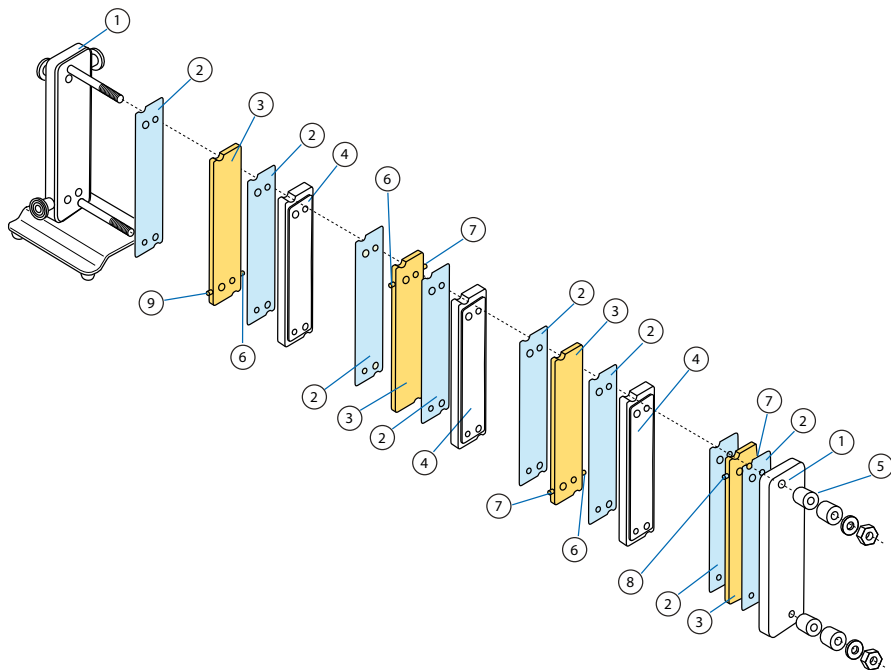
Refer to the *Pellicon® 2 Cassette Installation Guide* for cassette installation instructions.

Install only identical cassettes in the filter holder. Do not mix cassettes with different screens, membrane types, filtration areas, or nominal molecular weight cutoffs.

Installation of Pellicon® 2 Mini Cassettes requires inter-cassette gaskets. Each cassette is provided with two gaskets. The Pellicon® Single-Pass TFF Mini Kit provides two additional gaskets, all of which are required for installation.

The diverter plates must be installed between individual cassettes with the port locations alternating position as shown in the following illustration.

## Installation



## Components

Key	Description
1	Holder end plate
2	Gasket
3	Pellicon® Single-Pass TFF Mini diverter plate
4	Pellicon® 2 Mini Cassette
5	Tie rod spacer

## Port Descriptions

Key	Description	User Supplied Connections
6	Feed/retentate ports	Cap or pressure gauge with cap
7	Permeate ports	Hose barb for tubing connection and optional valve
8	Retentate port	Pressure gauge with hose barb and pinch clamp, for retentate outlet tubing
9	Blind permeate port	Cap

1. Loosen the nuts on the tie rods of the holder and remove the nuts, washers, tie rod spacers, and end plate.
2. Slide the Pellicon® 2 Mini Cassette gasket onto the holder so that the tie rods pass through the cutouts in the gasket.
3. Slide the Pellicon® Single-Pass TFF mini diverter plate onto the holder so that the tie rods pass through the cutouts in the diverter plate. Note the location of the fittings on the diverter plate.
4. Slide a gasket onto the holder.
5. Slide a Pellicon® 2 Mini Cassette onto the holder.
6. Slide a gasket onto the holder.
7. Slide a diverter plate onto the holder so that the fittings on the diverter plate are in the opposite location of the previous diverter plate.
8. Slide a gasket onto the holder.
9. Install the next Pellicon® 2 Mini Cassette.
10. Slide a gasket onto the holder.
11. Complete the installation with the required number of diverter plates, alternating the location of the ports on the diverter plates.
12. Slide a gasket onto the holder.
13. Install the end plate of the holder and torque the holder using the specifications described in the *Pellicon® 2 Cassette Installation Guide*.
14. To finalize the serial flow path, cap or connect tubing to the diverter plates ports (female luer lock) according to the descriptions listed in the table in this section.

#### NOTE

For details on installation and torque specification, please refer to the *Pellicon® 2 Cassette Installation Guide*.



## Pellicon® 2 Cassette Installation

### Required Equipment

Items listed in this table are required for a three-section single-pass TFF installation with Pellicon® 2 Cassettes. Sections may be added or removed as needed for each specific application.

Item Description	Quantity
Pellicon® Single-Pass TFF Cassette diverter plate	3
Pellicon® Single-Pass TFF Cassette retentate collection plate	1
Pellicon® 2 Cassette (includes two silicone gaskets)	3
Pellicon® 2 gasket (spare)	1
Pellicon® stainless steel holder	1

### NOTES

Refer to the *Pellicon® 2 Cassette Installation Guide* for cassette installation instructions.

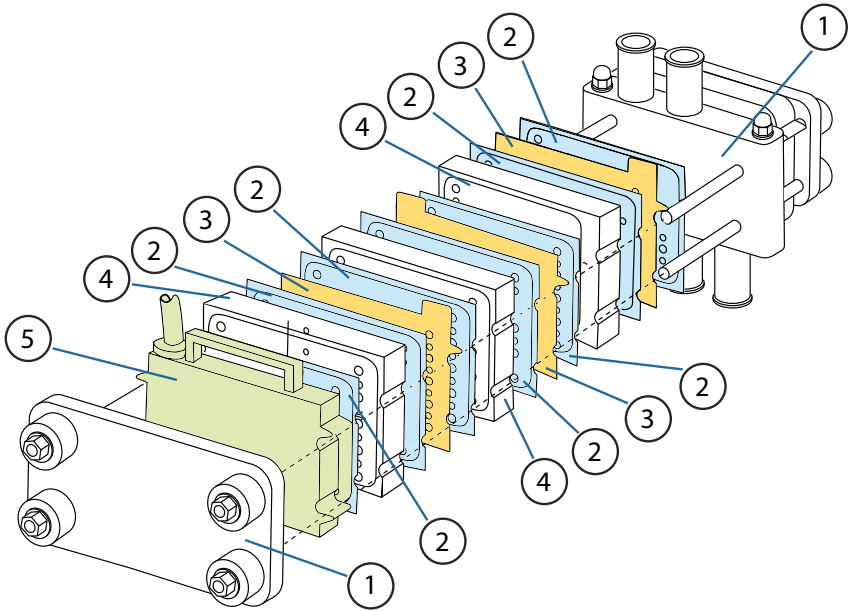
Install only identical cassettes in the filter holder. Do not mix cassettes with different screens, membrane types, filtration areas, or nominal molecular weight cutoffs.

Installation of Pellicon® 2 Cassettes requires inter-cassette gaskets. Each cassette is provided with two gaskets. Installation with diverter plates requires one additional gasket, which must be ordered separately.

The Pellicon® Single-Pass TFF Cassette retentate collection plate is required to collect the retentate from the single-pass TFF cassette installation.

The diverter plates must be installed between individual cassettes with the tab locations alternating as shown in the following illustration.

## Installation



Key	Description
1	Holder end plate
2	Gasket
3	Pellicon® Single-Pass TFF Cassette diverter plate
4	Pellicon® 2 Cassette
5	Pellicon® Single-Pass TFF Cassette retentate collection plate

1. Loosen the nuts on the tie rods of the holder and remove the nuts, washers, tie rod spacers and end plate.
2. Slide the Pellicon® 2 Cassette gasket onto the holder.
3. Slide the Pellicon® Single-Pass TFF cassette diverter plate onto the holder so the tab on diverter plate is on the feed flow side of the holder.
4. Slide a gasket onto the holder.
5. Slide a Pellicon® 2 Cassette onto the holder.
6. Slide a gasket onto the holder.
7. Slide a diverter plate onto the holder so the tab on diverter plate is on the opposite side of the previous diverter plate.

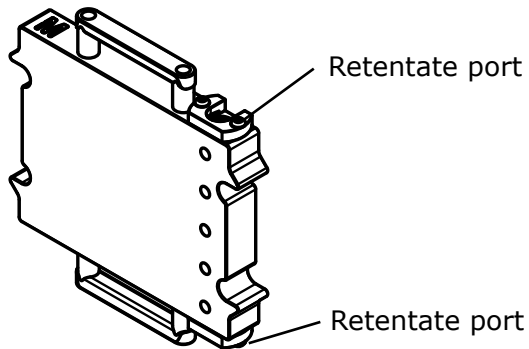
8. Slide a gasket onto the holder.
9. Install the next Pellicon® 2 Cassette.
10. Complete the installation with the required number of diverter plates, alternating the location of the tabs on the diverter plates.
11. Slide a gasket onto the holder.
12. To finalize the serial flow path, install the Pellicon® Single-Pass TFF Cassette retentate collection plate onto the holder by aligning the retentate collection openings of the retentate plate so they are on the opposite side of the feed tab of the last diverter plate installed.

## NOTES

The handle of the retentate plate may be removed to allow stacking of multiple process scale holders.

The retentate collection plate has two retentate outlet ports (3/4-inch TC) for installation flexibility. Use one to collect concentrated retentate and cap the unused port.

The permeate is collected through the Pellicon® holder permeate ports.



### *Retentate Collection Plate*

13. Install the end plate of the holder and torque the holder using the specifications described in the *Pellicon® 2 Cassette Installation Guide*.

## Pellicon® 3 88 cm<sup>2</sup> or 0.11 m<sup>2</sup> Cassette Installation

### Required Equipment

Items listed in this table are required for a three-section single-pass TFF installation with Pellicon® 3 88 cm<sup>2</sup> or 0.11 m<sup>2</sup> Cassettes. Sections may be added or removed as needed for each specific application.

Item Description	Quantity
Pellicon® Single-Pass TFF Mini Kit (includes four diverter plates and two silicone gaskets)	1
Pellicon® 3 88 cm <sup>2</sup> and 0.11 m <sup>2</sup> Cassette	3
Pellicon® Mini holder with extended tie rods	1

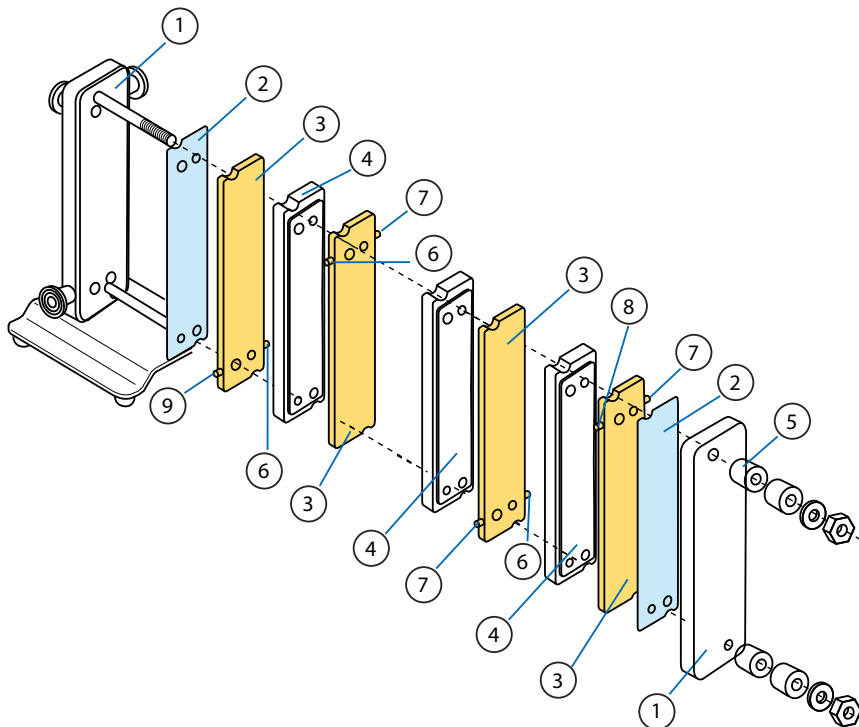
### NOTES

Refer to the *Pellicon® 3 Cassette Installation Guide* for cassette installation instructions.

Install only identical cassettes in the filter holder. Do not mix cassettes with different screens, membrane types, filtration areas, or nominal molecular weight cutoffs.

The diverter plates must be installed between individual cassettes with the ports in alternating positions as shown in the following illustration.

## Installation



## Components

Key	Description
1	Holder end plate
2	Gasket
3	Pellicon® Single-Pass TFF Mini diverter plate
4	Pellicon® 3 88 cm <sup>2</sup> or 0.11 m <sup>2</sup> Cassette
5	Tie rod spacer

## Port Descriptions

Key	Description	User Supplied Connections
6	Feed/retentate ports	Cap or pressure gauge with cap
7	Permeate ports	Hose barb for tubing connection and optional valve
8	Retentate port	Pressure gauge with hose barb and pinch clamp, for retentate outlet tubing
9	Blind permeate port	Cap

1. Loosen the nuts on the tie rods of the holder and remove the nuts, washers, tie rod spacers and end plate.
2. Slide a gasket onto the holder.
3. Slide the Pellicon® Single-Pass TFF mini diverter plate onto the holder so that the tie rods pass through the cutouts in the diverter plate. Note the location of the fittings on the diverter plate.
4. Slide a Pellicon® 3 Cassette onto the holder.
5. Slide a diverter plate onto the holder so that the fittings on the diverter plate are in the opposite location of the previous diverter plate.
6. Install the next Pellicon® 3 Cassette.
7. Complete the installation with the required number of diverter plates, alternating the location of the ports on the diverter plates.
8. Slide a gasket onto the holder.
9. Install the end plate of the holder and torque the holder using the specifications described in the *Pellicon® 3 Cassette Installation Guide*.
10. To finalize the serial flow path, cap or connect tubing to the diverter plates ports (female luer lock) according to the descriptions listed in the table in this section.

## Pellicon® 3 0.57 m<sup>2</sup> or 1.14 m<sup>2</sup> Cassette Installation

### Required Equipment

Items listed in this table are required for a three-section single-pass TFF installation with Pellicon® 3 0.57 m<sup>2</sup> or 1.14 m<sup>2</sup> Cassettes. Sections may be added or removed as needed for each specific application.

Item Description	Quantity
Pellicon® Single-Pass TFF Cassette diverter plate	3
Pellicon® Single-Pass TFF Cassette retentate collection plate	1
Pellicon® 3 0.57 m <sup>2</sup> or 1.14 m <sup>2</sup> Cassette	3
Pellicon® 3 manifold adapter plate	1
Pellicon® stainless steel holder	1

### NOTES

Refer to the *Pellicon® 3 Cassette Installation Guide* for cassette installation instructions.

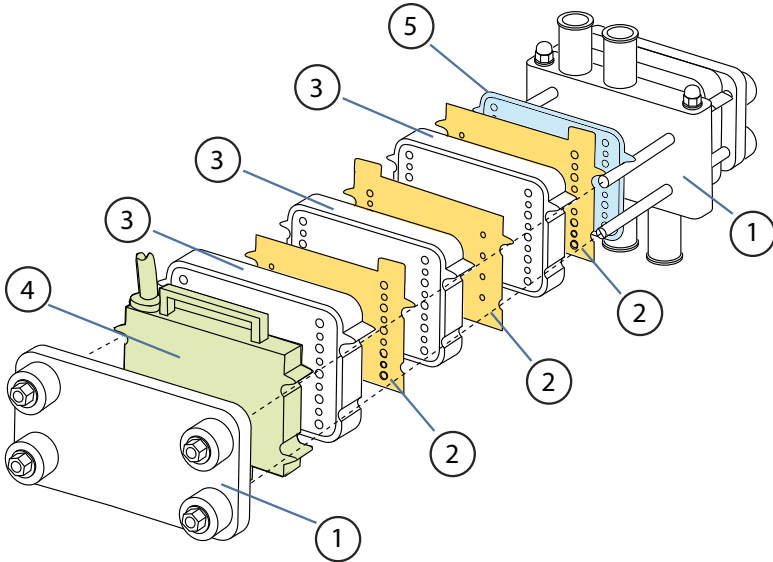
Install only identical cassettes in the filter holder. Do not mix cassettes with different screens, pore sizes or nominal molecular weight cutoffs.

The single-pass TFF installation with Pellicon® 3 0.57 m<sup>2</sup> or 1.14 m<sup>2</sup> cassettes requires one Pellicon® 2 inter-cassette gasket or one Pellicon® 3 Manifold adapter plate, which must be ordered separately.

The Pellicon® Single-Pass TFF Cassette retentate collection plate is required to collect the retentate from the single-pass TFF cassette installation.

The diverter plates must be installed between individual cassettes with the tab locations alternating as shown in the following illustration.

## Installation



Key	Description
1	Holder end plate
2	Pellicon® Single-Pass TFF Cassette diverter plate
3	Pellicon® 3 0.57 m <sup>2</sup> or 1.14 m <sup>2</sup> Cassette
4	Pellicon® Single-Pass TFF retentate collection plate
5	Pellicon® 3 manifold adapter plate

1. Loosen the nuts on the tie rods of the holder and remove the nuts, washers, tie rod spacers and end plate.
2. Slide the Pellicon® 2 inter-cassette gasket or Pellicon® 3 Manifold Adapter Plate onto the holder.
3. Slide the Pellicon® Single-Pass TFF cassette diverter plate onto the holder so the tab on diverter plate is on the feed flow side of the holder.
4. Slide a Pellicon® 3 Cassette onto the holder.
5. Slide a diverter plate onto the holder so that the tab on the diverter plate is on the opposite side of the previous diverter plate.
6. Install the next Pellicon® 3 Cassette.



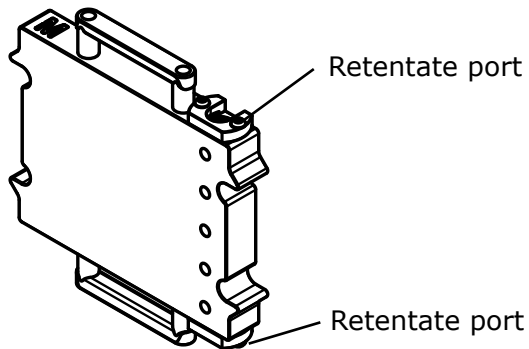
- Complete the installation with the required number of diverter plates, alternating the location of the ports on the diverter plates.
- To finalize the serial flow path, install the Pellicon® Single-Pass TFF Cassette retentate collection plate onto the holder by aligning the retentate collection openings of the retentate plate to be on the opposite side of the feed tab of the last diverter plate installed.

#### NOTE

The handle of the retentate plate may be removed to allow stacking of multiple process scale holders.

The retentate collection plate has two retentate outlet ports (3/4-inch TC) for installation flexibility. Use one to collect concentrated retentate and cap the unused port.

The permeate is collected through the Pellicon® holder permeate ports.



#### *Retentate Collection Plate*

- Install the end plate of the holder and torque the holder using the specifications described in the *Pellicon® 3 Cassette Installation Guide*.

# Flushing and Cleaning

## NOTE

The following flushing and cleaning recommendations are based on three cassettes in series. These recommendations are guidelines. Actual flushing and cleaning volumes and operating conditions depend on the membrane type, cutoff, and screen used, as well as the applied flow rate and retentate pressure. Evaluate flushing and effective cleaning procedures for each process to reach optimized conditions for each specific application.

## Flushing

An initial flush is required to remove storage solution from the membrane in new cassettes. Flushing should also be performed after each cleaning, depyrogenation, and sanitization step to remove residual solutions. Flushing is primarily done with purified water but may be performed with cleaning or buffer solutions.

1. Fill the tank with flushing solution.
2. Fully open the retentate valve and direct the retentate and permeate lines to drain.
3. Turn on the feed pump and pump flushing solution into the feed port of the Pellicon® holder at a feed flow rate of 1–4 L/min/m<sup>2</sup>.
4. When flow is established, partially close the retentate valve, if necessary, to achieve a conversion of 30–90%.  
(Conversion = permeate flow rate/feed flow rate).

## NOTE

A high conversion will result in faster overall flushing, but will require high trans-membrane pressure. Membranes with low permeability (low cutoff) will generally not achieve conversion at the high end of the range.

5. Flush until a total of approximately 150-300 liters of flushing solution per m<sup>2</sup> of installed filter area have been pumped through the system to drain. Achieving a minimum of approximately 100 L/m<sup>2</sup> through the permeate and 30 L/m<sup>2</sup> through the retentate is recommended. Depending on individual removal criteria, the total flush volume can be optimized.
6. At the end of the flush, continue pumping until the flow path lines are drained.

## Cleaning

To select a cleaning method, identify the application or suspected foulant from the *Cleaning Conditions* section of the appropriate cassette user guide. Select the cleaning agent or agents compatible with the membrane type and application requirements.

Sanitization, depyrogenation and storage agents are chosen similarly. In many instances, sanitization and depyrogenation may be accomplished in the same step. Some applications require a two-step cleaning procedure. In these cases, it is imperative that the primary cleaning agent be flushed completely from the system to avoid potentially harmful chemical reactions between cleaning agents.

The cleaning step should be run at a feed flow rate of 1–4 L/min/m<sup>2</sup> with the retentate valve partially closed to achieve a conversion of 30–90%. The retentate and permeate lines should be directed to drain.

1. Flush until a total of approximately 15-30 liters of cleaning solution per m<sup>2</sup> of installed filter area have been pumped through the system and out to drain. Alternatively, the flush can continue until the retentate and permeate conductivities approach the conductivity of the feed solution.
2. Turn off the pump, close the retentate and permeate valves, and allow the system to soak in the cleaning solution for the duration noted in the *Cleaning Conditions* section of the appropriate user guide. At the end of the final soak, pump the cleaning solution to drain to empty the flow path piping.

### NOTE

All surfaces exposed to process fluids should also be exposed to the cleaning solution. It is good practice to cycle (partially open and partially close) the valves at least twice during the cleaning cycle to ensure that all wetted internal surfaces of the valve body are exposed to the cleaning solution.

3. Flush the filter with water using the same feed flow rate and conversion conditions. Flush a total of approximately 15-30 liters of water per square meter of installed filter area through the system to drain. Alternatively, the flush can continue until retentate and permeate conductivity reaches an acceptable target.

## Sanitization

Sanitization should always be performed after the membrane has been thoroughly cleaned and flushed to reduce bioburden.

Sanitization pressures, feed flow rates and volumes are identical to those used for cleaning. See the [Cleaning](#) procedure.

Select a sanitization agent from the appropriate user guide.

## Depyrogenation

Depyrogenation should only be performed after the system has been cleaned, sanitized, and flushed.

Depyrogenation feed flow rate, pressure and volumes are identical to those used for cleaning. See [Cleaning](#).

Water for injection should be used during depyrogenation.

Select a depyrogenation agent from the appropriate user guide.

## Integrity Testing

The module integrity should be tested on a cleaned and thoroughly flushed system. The presence of residual cleaning agents can significantly alter integrity test results. Integrity testing should be performed on a water-wet membrane only.

1. Ensure that the system is thoroughly cleaned and that the membrane is thoroughly wetted. Thorough wetting can be ensured by flushing water at 2.1 bar (30 psi) TMP for five minutes.
2. Drain the system of water.

### NOTE

It is important to drain the retentate side of the system as thoroughly as possible.

3. Attach a regulated and filtered air supply to the feed or retentate port on the holder, preferably to the more elevated end.
4. Isolate the remaining port (feed or retentate) by closing a valve or capping the port if there is no valve on it.
5. The permeate line should be open at all times.
6. Slowly raise the air pressure to the recommended value and wait at least five minutes to purge residual water in the permeate line.

### NOTE

Do not exceed the recommended air pressure as this may result in excessively high air flow (a false failure). Rewet the membrane if this occurs.

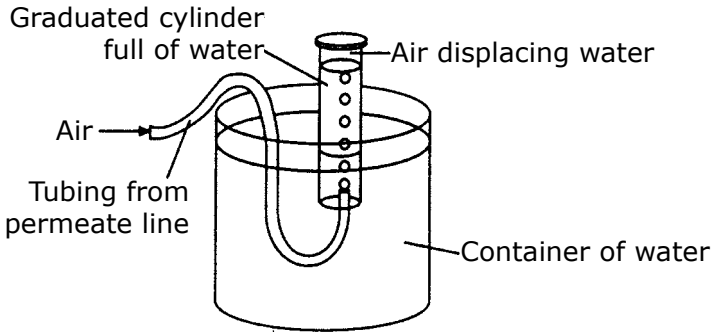
7. Measure and record the air pressure, temperature and the air flow rate exiting the permeate line. The air flow rate may be measured with an air flow meter or by measuring the air displaced into a submerged and inverted volumetric cylinder as shown in the figure here.

### NOTE

The air flow rate from each permeate line can be measured independently for Pellicon® 2 Mini 0.1 m<sup>2</sup> and Pellicon® 3 88 cm<sup>2</sup> and 0.11 m<sup>2</sup> cassette installations.

Automated filter integrity testers may be used for air integrity testing of TFF devices.

8. Compare the measured air flow rate to the specified flow value in the Certificate of Quality of the appropriate cassette. If the measured air flow rate is equal to or less than the maximum specified value, the cassette may be used for processing. If the measured air flow rate exceeds the specified value, refer to the troubleshooting section of the appropriate user guide.



### *Integrity Testing Setup*

## Measurement of Normalized Water Permeability (NWP)

The normalized water permeability (NWP) for Pellicon® Cassette membranes should be established prior to the first use of each filter. New membranes should be cleaned, flushed, and integrity tested before measuring NWP. The NWP measured at this point is used as a benchmark against subsequent NWP measurements to determine cleaning efficacy.

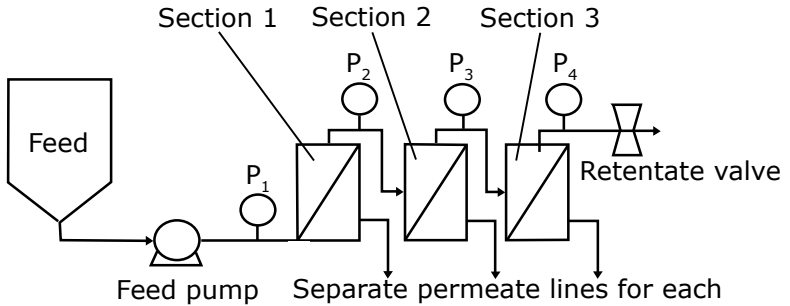
1. Direct the permeate and retentate lines to the drain. Close the tank drain valve and open the retentate valve. Open the permeate valve if present.
2. Fill the tank with filtered deionized water, water for injection, or reverse osmosis water. The flush water must be extremely pure to avoid fouling the membranes or introducing other contaminants into the system. The NWP may be measured with solutions other than water (i.e., storage solution or buffer) as long as the same conditions and solution are used for each measurement.
3. Turn on the feed pump and pump water into the feed port of the Pellicon® holder at a flow rate of 1–4 L/min/m<sup>2</sup>.
4. When flow is established, partially close the retentate valve, if necessary, to achieve a conversion of approximately 30–90%. The same feed flow rate and pressure conditions MUST be used each time NWP is measured to ensure accuracy.
5. Flush water for a minimum of ten minutes. Ensure that the pressure and the temperature conditions are stable.
6. Record the feed and permeate flow rates, feed, retentate, and permeate pressures, and the temperature of the water.
7. After the NWP measurement is complete, continue pumping until the flow path lines are drained.

NOTE: NWP measurement for individual sections:

For Pellicon® 2 0.1 m<sup>2</sup> and Pellicon® 3 88 cm<sup>2</sup> and 0.11 m<sup>2</sup> cassette installations, NWP can be measured for the individual cassettes with all other cassettes installed in the holder with diverter plates by measuring the pressures and permeate flows of each section independently.



Open the permeate line of the cassette being measured and close the permeate lines of the cassettes not being measured. Use the retentate valve to adjust the outlet pressure of the cassette being measured. Measure NWP. Repeat the process for all remaining cassettes/sections. Ensure each individual cassette is measured under similar flow and pressure conditions. Use the same feed flow rate and adjust the retentate valve for each cassette NWP measurement so that the resulting outlet pressure value is similar for all.



### Three-section NWP test setup for individual sections

Calculate the NWP:

$$\text{NWP} = \frac{J_f}{\text{TMP}} = \frac{R \times F}{A \times \left\{ \left[ \frac{P_{\text{in}} + P_{\text{out}}}{2} \right] - P_p \right\}}$$

This equation yields units  
LMH/bar or LMH/psi [liters/m<sup>2</sup> x hours x bar or psi]

$J_f$  = permeate flux  
TMP = Trans-membrane pressure

Calculate:

R = Permeate flow rate in L/hour  
P in = Feed pressure in bar or psi  
P out = Retentate pressure in bar or psi  
T = Water temperatures in °C  
Pp = Permeate pressure (if non-zero) in bar or psi  
A = Total filter area in m<sup>2</sup>  
F = Temperature correction factor from the table in this section.

There may be an initial NWP decline after initial use and exposure to cleaning solutions. Stable NWP from run to run is achievable thereafter until the membrane starts to reach the end of life, at which point a steady change in NWP will usually be observed and process performance measurements such as process time, permeate flux or product yield are affected.

The acceptance criterion for cleaning efficacy as measured by NWP is membrane and application specific and may vary between facilities. Of key importance are stable process flux and no carry over from previous runs.

If the NWP decreases significantly from run to run, cleaning procedures may be inadequate. Alternative cleaning agents and procedures should be investigated.

### NWP Temperature (T) Correction Factor (F)\*

T (°F)	T (°C)	F	T (°F)	T (°C)	F	T (°F)	T (°C)	F
125.6	52	0.595	96.8	36	0.793	68.0	20	1.125
123.8	51	0.605	95.0	35	0.808	66.2	19	1.152
122.0	50	0.615	93.2	34	0.825	64.4	18	1.181
120.2	49	0.625	91.4	33	0.842	62.6	17	1.212
118.4	48	0.636	89.6	32	0.859	60.8	16	1.243
116.6	47	0.647	87.8	31	0.877	59.0	15	1.276
114.8	46	0.658	86.0	30	0.896	57.2	14	1.310
113.0	45	0.670	84.2	29	0.915	55.4	13	1.346
111.2	44	0.682	82.4	28	0.935	53.6	12	1.383
109.4	43	0.694	80.6	27	0.956	51.8	11	1.422
107.6	42	0.707	78.8	26	0.978	50.0	10	1.463
105.8	41	0.720	77.0	25	1.000	48.2	9	1.506
104.0	40	0.734	75.2	24	1.023	46.4	8	1.551
102.2	39	0.748	73.4	23	1.047	44.6	7	1.598
100.4	38	0.762	71.6	22	1.072	42.8	6	1.648
98.6	37	0.777	69.8	21	1.098	41.0	5	1.699

\*Based on Water Fluidity Relative to 25 °C (77 °F) Fluidity Value  
 $F = (\mu_{T\text{ }^\circ\text{C}}/\mu_{25\text{ }^\circ\text{C}})$  or  $(\mu_{T\text{ }^\circ\text{F}}/\mu_{77\text{ }^\circ\text{F}})$

## Storage

After the system has been thoroughly cleaned, flushed, and tested, it can be stored until needed for processing.

Storage pressures, feed flow rates, and volumes are identical to those used for cleaning.

Refer to the appropriate user guide for storage solutions.

### Storing the Filters in the System

1. Shut off the feed pump and clamp the lines to or from the holder or shut the feed, retentate, and permeate valves to keep the holder and filters full of storage solution.
2. Store the holder and filters at either ambient temperature or 2–8° C.

### Storing the Filters without the System

The filters can be removed from the holder for storage.

1. Shut off the feed pump and drain the system.
2. Open the holder and remove the fully wetted filters.
3. Place the filters in a liquid tight container and fill the container with excess storage solution to immerse the filter.
4. Seal the container and store at 2–8° C. Do not freeze.

Suitable storage containers include plastic freezer bags with zipper seals, molded polyethylene or polypropylene freezer containers, and plastic pails with locking and sealing lids.

## Standard Product Warranty

The applicable warranty for the products listed in this publication may be found at [www.emdmillipore.com/terms](http://www.emdmillipore.com/terms) (within the "Terms and Conditions of Sale" applicable to your purchase transaction).

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For additional information and documentation please contact:

Merck KGaA, Darmstadt, Germany  
Corporation with General Partners  
Frankfurter Str. 250  
64293 Darmstadt, Germany  
Phone: + 49 6151-72 0



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