



1812 Spiral Wound Membrane Housing (Evonik Compatible)

Assembly & Operation Manual

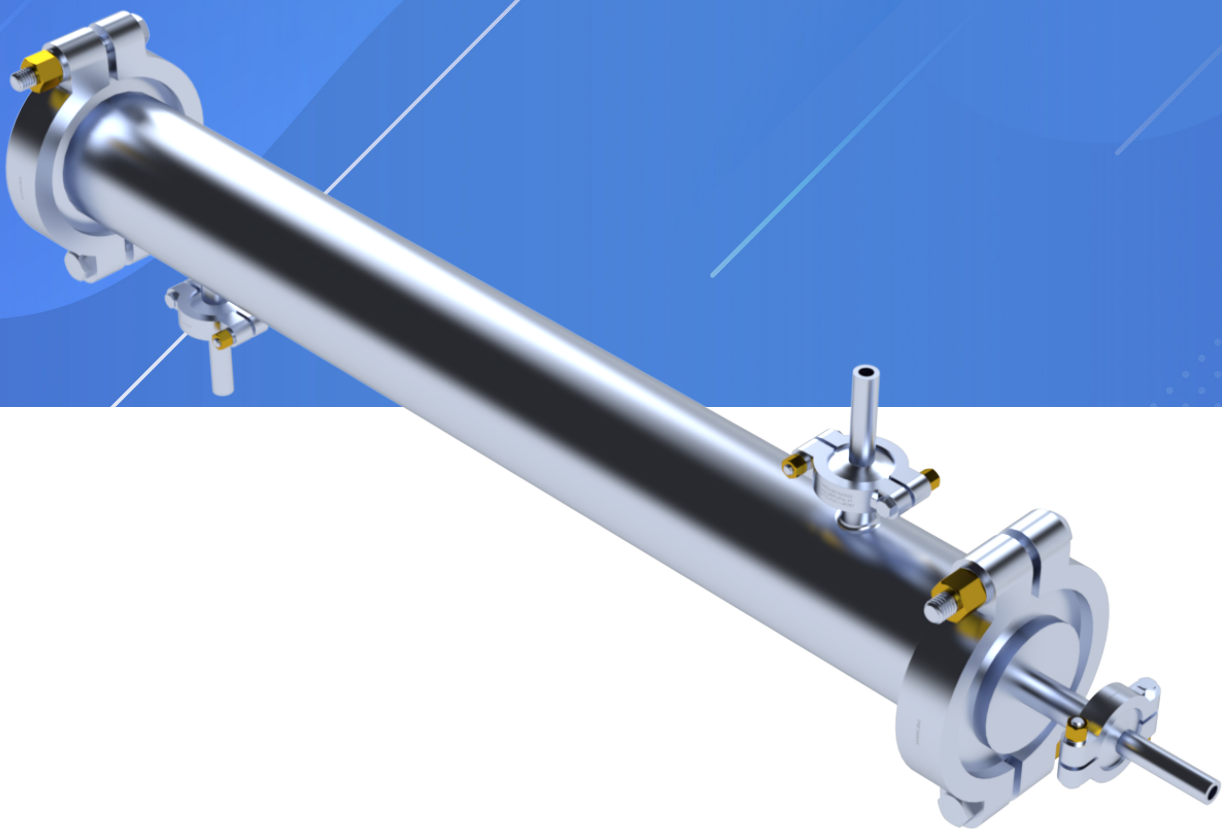


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Introduction

The 1812 Spiral Wound Membrane Housing is a bench-scale cross flow filtration system that is designed to evaluate 1812 spiral wound membrane elements in a variety of applications. It simulates the flow dynamics of commercially available spiral wound membrane elements. Users can vary the operating conditions and fluid dynamics over broad ranges.

Table 1 below outlines the features and technical specifications of the 1812 Spiral Wound Membrane Housing (hereafter referred to as 1812 Housing).

Prior to operating or servicing this device, this manual must be read and understood.

Table 1: 1812 Housing Features and Technical Specification

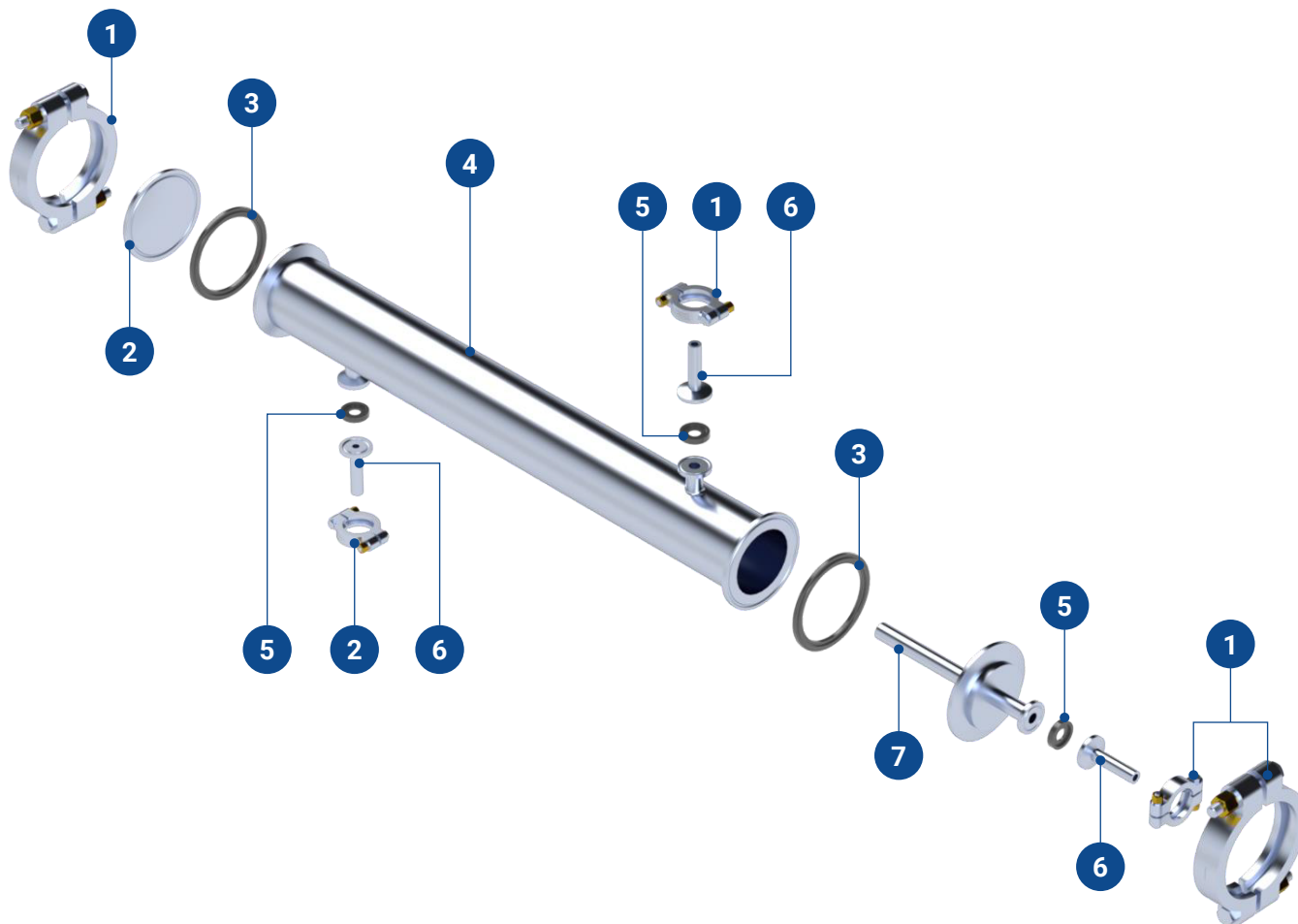
PARAMETER	DESCRIPTION
Membrane Operation	Cross Flow
Housing Material	316 Stainless Steel
Membrane Active Area	Variable (1 to 5 ft ²)
Membrane Permeate Compatibility	Male - 19 mm (0.75 inch) OD Extension
Maximum Pressure	60 bar (870 PSI)
Maximum Temperature	177 °C (350 °F)
Recommended Feed Rate	See Membrane Manufacturer Spec Sheet (~11.5 LPM or 3.0 GPM)
Dimensions	
Internal Diameter	53.3 mm (2.10 inches)
Internal Length	510 mm (20.1 inches)
Inlet/Outlet/Permeate Connection	3/8" Sanitary Fittings
Securing Method	High Pressure Tri-Clamp (Sanitary) Fittings

Note: Maximum Pressure and Temperature ratings are dependent on a variety of factors. Listed values are guidelines based upon material properties and cannot be guaranteed in every application.

1812 Housing Components

Figure 1 illustrates a typical assembly of the 1812 housing.

Figure 1: 1812 Housing Assembly (Evonik)



NUMBER	DESCRIPTION	MATERIAL	WETTED?
1	High-Pressure Clamp	Stainless Steel / Brass	No
2	Housing End Cap	316 Stainless Steel	Yes
3	2.5" Sanitary Gaskets	Viton*	Yes
4	Housing Body	316 Stainless Steel	Yes
5	.5" Sanitary Gaskets	Viton*	Yes
6	Sanitary Adapter Fitting (3/8" Tube Extension)	316 Stainless Steel	Yes
7	Housing Permeate Cap	316 Stainless Steel	Yes

* Standard, Other Materials Available

1812 Housing Assembly

To assemble the 1812 Housing (with a membrane element):

1. Remove both sanitary fittings to remove the Housing Permeate Cap and End Cap.
2. If you are using a male Evonik 1812 element, use the included compression adapter fitting to connect the Housing Permeate Cap to the element (opposite end of the gasket, if applicable). Swage the fitting to both parts and then disconnect the Permeate End Cap from the fitting.

Note: *Swaging of compression fittings is permanent. Replacement nuts and ferrules are required to use additional elements.*
3. On the other end of the element, swage the other compression adapter fitting and cap to the permeate extension.
4. Slide the element (non-gasket-side first) all the way through the housing so that the first half of the element is sticking out the other end. Ensuring a gasket is installed against this housings end, re-swage the element to the Permeate Cap. Secure the cap and gasket with the removed sanitary clamp.
5. Resecure the Housing End Cap to the other end of the housing using the removed clamp and gasket.

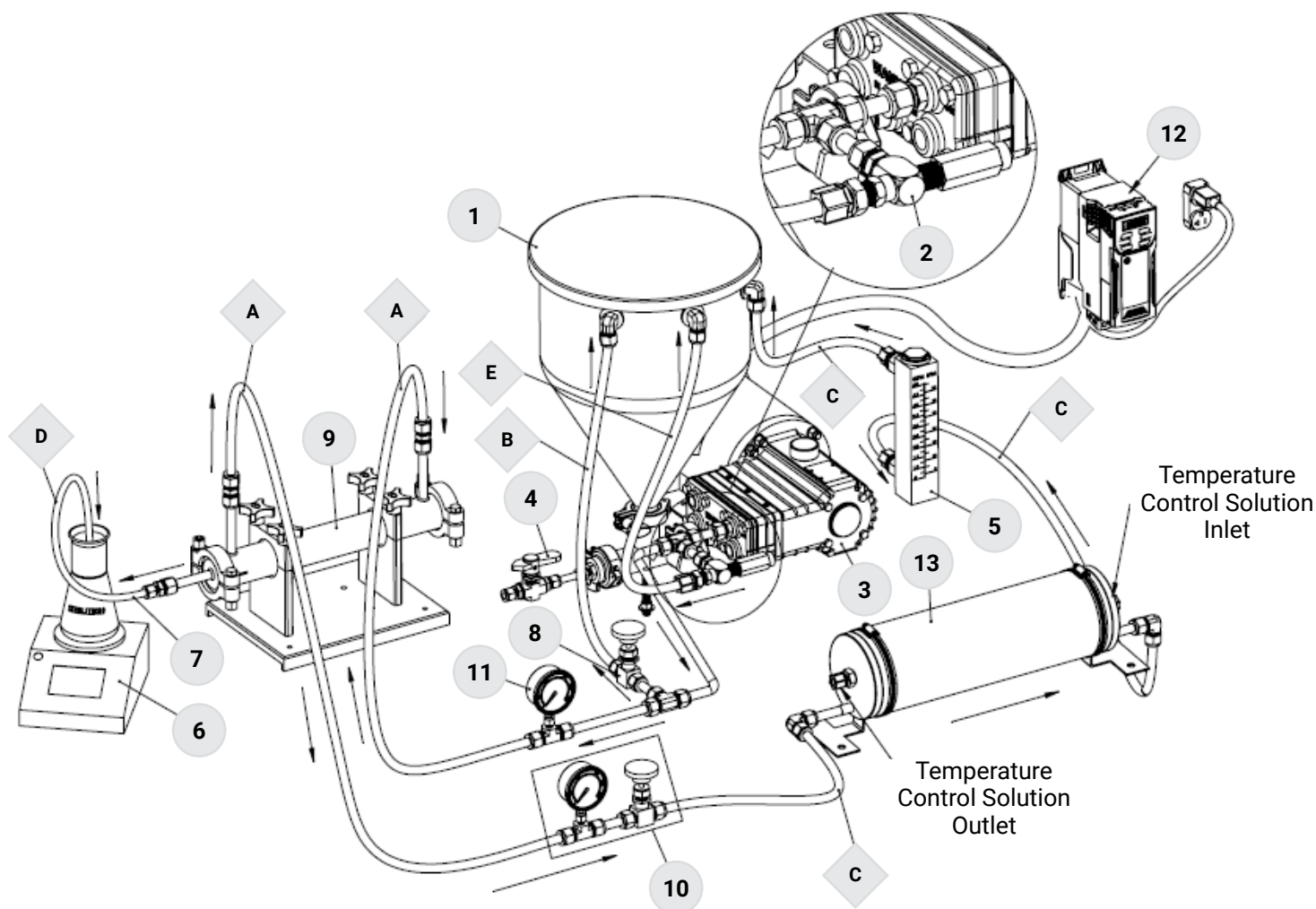
To remove the 1812 Element from the housing:

1. Drain the Housing as much as possible.
2. Remove the sanitary clamp to the Housing Permeate Cap.
3. Grab the Housing Permeate Cap to pull the element through the permeate side of the 1812 housing.
4. Separate the element from the Housing Permeate Cap by separating the adapter from the cap. This may take a bit of force.

Note: *As mentioned above, additional compression nuts and ferrules will be required to use additional elements.*

1812 Housing Connections and Parts

Figure 2: Cross Flow System Diagram for 1812 Housing



Legend

1	5 Gal Conical Tank w/ Tee	10	Concentrate Control Valve Assembly
2	Relief Valve	11	Feed Pressure Gauge
3	Motor Pump Assembly	12	Variable Frequency Drive (VFD)
4	Drain Valve	13	Heat Exchanger
5	Flow Meter	A	High Pressure Flex or Rigid Tubing, Feed Line
6	Scale for Measuring Permeate Flux	B	Low Pressure Tubing, Bypass Line
7	Permeate Collector	C	Low Pressure Tubing, Return Line
8	Bypass Needle Valve with Tee Fitting	D	Low Pressure Tubing, Permeate Output Line
9	1812 Housing Assembly	E	Low Pressure Tubing, Relief Return Line

Operation of the 1812 Housing

Once the 1812 Housing has been assembled and connected to a feed pump, it can be used in reverse osmosis, ultrafiltration, nanofiltration, and microfiltration separation processes for applications in a variety of industries, including food and beverage, pharmaceutical, or industrial.

To operate the 1812 Housing Assembly:

1. Open all the valves in the system to relieve any pressure build-up before turning on the feed pump.

2. Turn the system ON and set the feed pump to desired flow rate.

Note: *If a bypass line is present, slowly close the bypass control valve; this valve is required only at low pressures and flows. Leaving the bypass line slightly open can also help to stabilize the system.*

3. Set the feed pressure by gradually closing the concentrate control valve assembly. Do not exceed the maximum pressure rating of the cell, membrane or system.

Note: *A good starting point may be to set the system at 1.7 bar (25 PSIG) pressure for ultrafiltration or 17.2 bar (250 PSIG) for reverse osmosis.*

4. Verify the feed pressure reading on the concentrate pressure gauge.

5. Adjust the concentrate flow control valve to obtain the desired pressure and flow.

Note: *Experimentation is required to determine the optimum settings of pressure and flow rate to use on the chosen membrane and the fluid being processed.*

6. Once the experiment is complete, shut down the system by turning the feed pump OFF and opening all the valves to relieve any pressure build up.

To replace an element:

1. Turn the feed flow pump OFF.

2. Open all the valves in the system to relieve any pressure build up.

3. Remove the sanitary clamp on the permeate side of the housing. Grab the housing permeate cap to pull the element out of the housing body.

4. Remove the permeate line adapters from each end of the element.

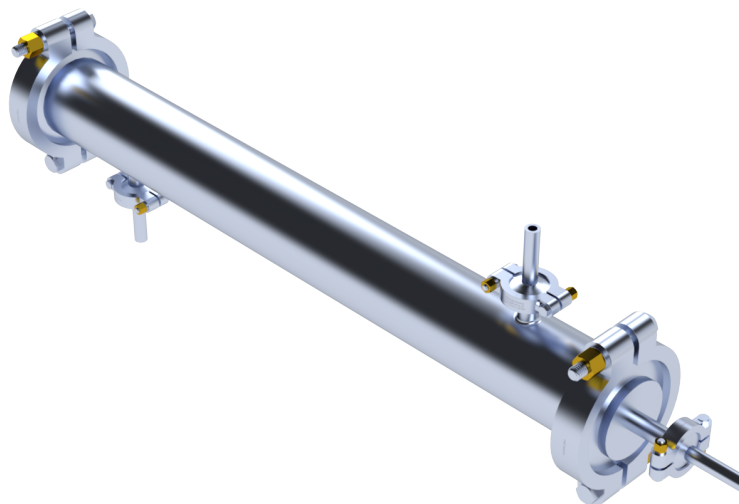
5. Follow Steps 2-4 of the Housing Assembly (Page 5) to install the new element in the housing. New compression nuts and ferrules will be required.

6. Reattach any hoses to your element removed during the element replacement.

Supplementary Operating Information

Additional Resources

- [MPD Cell Quick Reference Guide](#)
- [MPD Video Channel](#)
 - Housing Assembly
 - System Operation
- [CF Filtration Handbook](#)
 - Basics of Cross Flow Filtration
 - FAQs
 - Example Studies
 - Preconditioning Membranes
 - Temperature Effect on Membranes
- [How to Swage a Compression Fitting](#)
- [How to Clean Membranes](#)



Analyzing Membrane Performance Results

Spiral wound membranes containing mesh spacers are usually operated with a fluid velocity across the membrane surface of 0.1–0.5 m/sec (0.3–1.6 ft/sec). Higher velocities in membranes may lead to excessive pressure differential across the membrane and possible damage. Hollow fiber membranes, tubular membranes, and membranes with tubular spacers may be operated at higher velocities, but this may not contribute to a more effective operation.

Other parameters such as viscosity, pressure, and suspended solids may also affect performance/operation. Experimentation with the 1812 Housing can help predict the best operating parameters.

Housing and Membrane Cleaning

The 1812 Housing can be cleaned with or without the membrane installed. Leave the membrane installed to simulate the cleaning conditions of Clean-In-Place (CIP), a common practice in larger systems with spiral-wound or tubular membranes.

During CIP, cleaning solutions are re-circulated and, in some cases, allowed to sit for a period of time within the cell body. In some cases, the feed pump can be used to re-circulate the cleaning solutions.

Refer to the Membrane Cleaning Blog linked above for recommended cleaning instructions.

Accessory & Spare Part Ordering Information

PRODUCT	LINK
System Components (Pump, Flow Meters, Pressure Gauges, etc.)	System Components
Housing Stand	1200052
Spare Parts	Spare Parts

Product Support

Return Material Authorization

If materials are to be returned to Sterlitech for repair, evaluation, or warranty consideration, a Return Material Authorization (RMA) number and form must be obtained from Sterlitech prior to the return. Contact Sterlitech's Customer Service Department for these forms.

Be sure to include a complete, detailed written reason for the return. Also, include serial numbers, installation and removal dates, and any other information that is available. The cross flow cells have a serial number imprinted on them.

Indicate the proposed disposition of the material, and reference the RMA number on all packages or cartons. All material must be shipped to Sterlitech with freight prepared by the customer.

Warranty

The following is made in lieu of all other warranties expressed or implied. Sterlitech Corporation guarantees equipment to be free from defects in material and workmanship when operated in accordance with written instructions for a period of one year from receipt. Parts not manufactured by Sterlitech are covered by their manufacturer's warranties, which are normally for one year.

Manufacturers and Seller's only obligation shall be to issue credit against the purchase or replacement of equipment proved to be defective in material or workmanship. Neither manufacturer nor seller shall be liable for any injury, loss or damage, direct or indirect, special or consequential, arising out of the use of, misuse, or the inability to use such product.

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Technical Assistance

Please contact us if you have any questions or technical inquiries about our products by calling Sterlitech Corporation at **1-877-544-4420** or by visiting www.sterlitech.com.

Company Background

Founded in 2001 in Kent, WA, Sterlitech Corporation manufactures and markets filtration-focused laboratory products to a broad spectrum of scientific and industrial sectors. Its line of flat sheet membranes and tangential flow cells deliver industry-leading performance and reliable results. Configured for reverse osmosis, nanofiltration, ultrafiltration, and microfiltration applications, Sterlitech's benchtop cross flow membrane test system provides the versatility required to innovate.

Sterlitech's comprehensive line of products is supported by the expertise of its technical specialists who can assist with application-specific product selection, and provide customized solutions where necessary. Unique problem-solving approaches, flexibility, and consistent quality have made Sterlitech Corporation a renowned global provider of filtration products and equipment.

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