STERLITECH

Corporation

HP4750X - Hastelloy

Assembly & Operation Manual



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Introduction

The Hastelloy HP4750X is a high-pressure, chemically resistant stirred cell made of Hastelloy that performs a wide variety of membrane separations. With a maximum pressure rating of 172 bar (2500 PSI), the Hastelloy HP4750X Cell is ideally suited for reverse osmosis (RO) filtration, nanofiltration (NF), ultrafiltration (UF), and microfiltration (MF) separations.

Table 1 outlines the operational parameters and technical specifications of the Hastelloy HP4750X.

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

Table 1: Hastelloy HP4750X Features and Technical Specifications

PARAMETER	DESCRIPTION
Membrane Operation	Dead-End (Normal)
Cell Material	Hastelloy C276
Membrane Active Area	14.6 cm² (2.26 in²)
Membrane Size (Diameter)	47-49 mm
Maximum Pressure	172 bar (2500 PSI)
Maximum Temperature*	205 °C (400 °F) @ 138 bar (2000 PSI)
Processing Volume	Up to 300 mL
Hold-Up Volume	1 mL
Maximum Torque (for Nuts)	20 ft-lbs
Connections	
Pressure Inlet	1/4” Compression
Permeate Outlet	1/8” OD Tubing Extension
Autoclavable	Yes

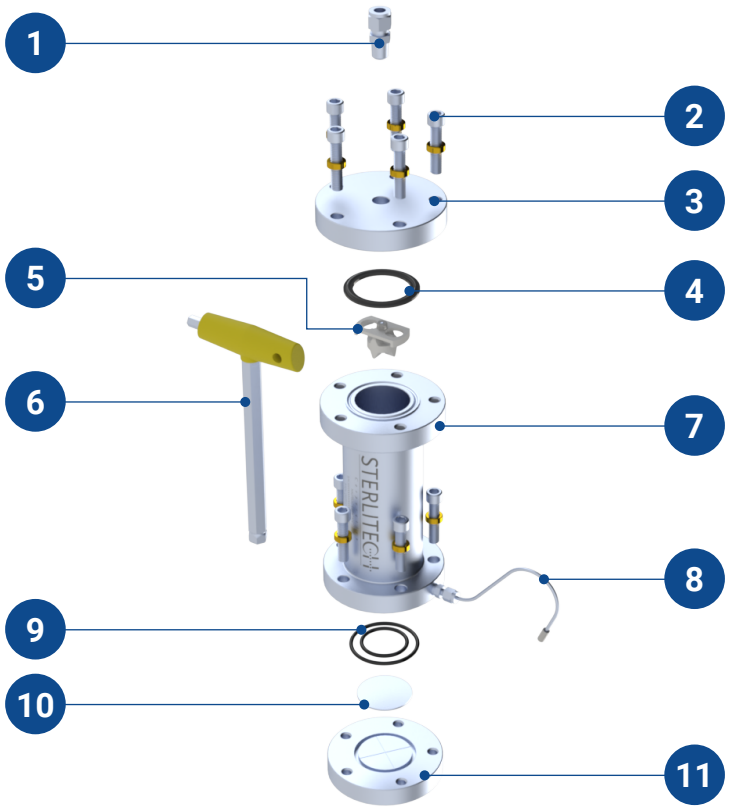
Note: *Maximum Pressure and Temperature ratings are dependent on a variety of factors. Listed values are guidelines based upon material properties and cannot be guaranteed in every application.*

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Hastelloy HP4750X Cell Components

Figure 1 illustrates a typical assembly of the Hastelloy HP4750X Cell.

Figure 1: Hastelloy HP4750X Cell Body Assembly



NUMBER	DESCRIPTION	MATERIAL	WETTED?
1	Pressure Inlet Fitting	316 Stainless Steel	No
2	Screw & Washer Set	Stainless Steel / Brass	No
3	Cell Top	Hastelloy C276	Yes
4	Top Gasket	Viton*	Yes
5	Stir Bar Assembly	Hastelloy / PTFE	Yes
6	T-Handle Hex Key	Chrome-Plated Steel / Plastic	No
7	Cell Body	Hastelloy C276	Yes
8	Permeate Tube	Hastelloy C276	Yes
9	O-Rings	Viton*	Yes
10	Sintered Metal Support	Hastelloy C276	Yes
11	Cell Bottom	Hastelloy C276	Yes

** Standard, Other Materials Available* *** Not Shown*

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Hastelloy HP4750X Cell Assembly

To assemble the Hastelloy HP4750X Cell: (Video)

1. Wet the O-rings with a small amount of water or the fluid to be processed and install them into the grooves on the cell bottom.

   Caution: *Make sure that the O-rings lie flat in the grooves of the cell bottom. Leaking may occur if the O-rings do not lie flat in the grooves. The O-rings will be cut or crushed when the system is operating if the O-rings are not installed correctly.*

2. Place a piece of pre-cut membrane over the inner O-ring. The membrane should be installed with the shiny side (active side) down, toward the cell body (reservoir). Ensure the membrane is centered over the inner O-ring to prevent leakage.

3. Place the porous support disc on top of the membrane to hold the membrane in place.

   Note: *If you cut your own membranes, the porous support disc can be used as a template. See* **Page 8** *for more details.*

4. Fit the cell bottom onto the cell body, aligning the circular groove with the circular ridge on the bottom of the cell body. Holding the cell bottom against the cell body, flip the assembly over and set it down on the cell bottom.

5. Use the Hex Key to install five screws with washers into the cell bottom. Tighten the screws in an alternating (star) pattern to ensure even pressure on the O-rings.

6. Attach the permeate tube onto the fitting on the side of cell body. Tighten the fitting using a wrench.

7. Insert the stir bar assembly by lowering it into the cell with the stir bar retriever. **Figure 2** shows the correct position of the stir bar assembly. After the assembly is in place, pour the solution to be filtered into the cell body.

8. Insert the top gasket on the top of the cell body, making sure it fits properly in the grooves.

9. Use the Hex Key to install five screws with washers through the cell top into the cell body. Tighten the screws in an alternating (star) pattern to ensure even pressure on the top gasket. Center the HP4750X Stirred Cell on top of a magnetic stirrer for operation.

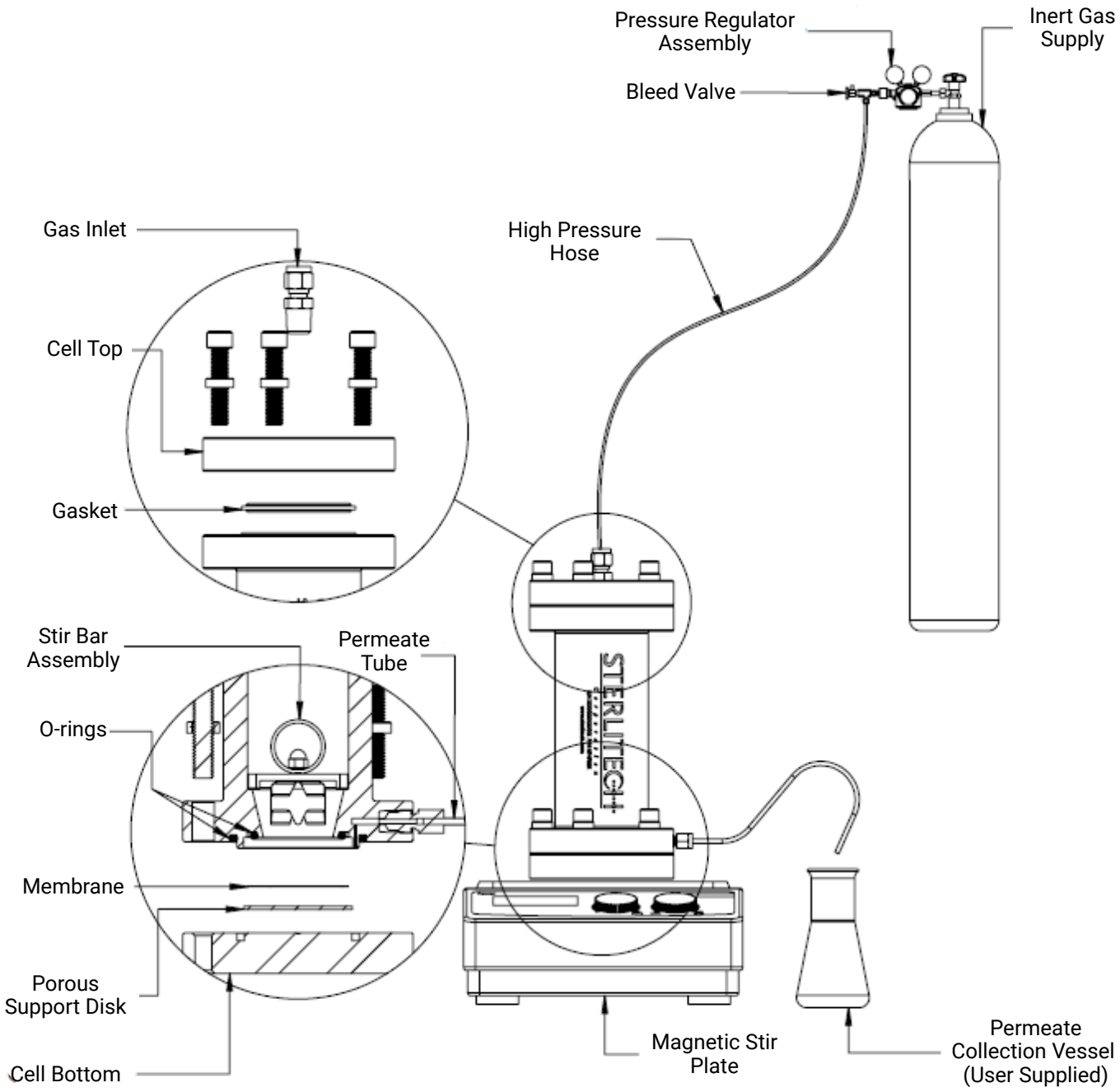
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Hastelloy HP4750X Cell Connections and Parts

The Hastelloy HP4750X Cell requires a high-pressure hose, bleed valve, pressure regulator assembly, and an inert gas supply. These items are sold separately and can be found on **Page 9**.

Figure 2 shows the typical system configuration for an Hastelloy HP4750X Cell.

Figure 2: System Diagram for Hastelloy HP4750X Cell



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Operation of the Hastelloy HP4750X Cell

After completing the Hastelloy HP4750X Cell assembly the cell can now be operated with the system.

To operate the Hastelloy HP4750X Cell: (Video)

1. Attach a high-pressure hose to the pressure inlet fitting on the cell top.

2. Connect the other end of the hose to the pressure regulator assembly on the inert gas (or compressed air) supply.

   Note: *The compressed air or gas source selected will determine the regulator type required.*

3. Place a permeate collection vessel (user supplied) under the permeate tube.

4. Turn on the magnetic stirrer to start the motion of the Stir Bar Assembly.

5. Begin filtration by gradually pressurizing the HP4750X Hastelloy Stirred Cell, checking for leaks. Foreign material on the surface of the seals and insufficient tightening of the screws are the most common causes for leakage.

   Note: *Preconditioning the membranes before use will ensure consistent performance. See* **Page 9** *for more details.*

6. Upon test completion, turn off the pressure source and depressurize the unit by loosening the pressure bleed valve.

   Caution: *Do not depressurize the HP4750X Hastelloy Stirred Cell by loosening the fittings.*

7. Once it is depressurized and empty, the HP4750X Hastelloy Stirred Cell can be cleaned with a variety of cleaners, including detergents, solvents, caustic, acid, enzyme cleaners, etc.

   Note: *Choice of the appropriate cleaning regime should also consider the compatibility of the gasket and O-ring material. For additional guidance, see the link on* **Page 8** *for membrane cleaning.*

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Supplementary Operating Information

Additional Resources

- MPD Cell Quick Reference Guide
- MPD Video Channel
  - Cell Assembly
  - Cell Operation
  - Mechanical Stirrer Assembly
- 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



Membrane Cutting with a Template

Sterlitech offers a wide variety of membranes that have been pre-cut for use with the Hastelloy HP4750X. However, if you need cut your own membrane for use with the HP4750X Hastelloy Stirred Cell, then you will need the following items:

- The porous stainless steel support disk, which will serve as the template
- The membrane sheet to be cut
- A pair of sharp scissors
- A pair of latex gloves

To cut a membrane disk filter for the Hastelloy HP4750X:

1. While wearing latex gloves, take the porous support disc and place the membrane sheet against it.

2. Cut the membrane along the edge of the disc with scissors. Hold the scissors at an angle towards the center of the disc to avoid under-trimming. Once finished, the membrane should sit perfectly flat on supports without any bending and extend outside of the inner O-ring to avoid leakage.

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Preconditioning Membrane Disc Filters

To precondition the membrane:

1. Load the membrane into the HP4750X Hastelloy Stirred Cell.
2. Fill the stirred cell with deionized water and pressurize the cell. The temperature of the water and the pressure used should be the same as the temperature and pressure that will be used in the actual trials.
3. Run deionized water through the cell until flux is relatively constant. After a few minutes, flux through the membrane will stabilize following a sharp change.
4. Release pressure, discard the deionized water and fill the tank with desired feed sample.

Accessory & Spare Part Ordering Information

PRODUCT	LINK
HP4750X Hastelloy Cell	HP4750X Hastelloy
Mechanical Stirrer Kit - Hastelloy (110V)	**1140173** (Contact Sales for a Quote)
Mechanical Stirrer Kit - Hastelloy (230V)	**1140085** (Contact Sales for a Quote)
System Components	
Pressure Regulator Assembly	1144026
Pressure Bleed Valve	1155893
High Pressure Hose	1151427
Magnetic Stirring Plate (110V)	81322300
Magnetic Stirring Plate (230V)	**81322302** (Contact Sales for Quote)
Accessories	
HP4750X Heating Jacket and Controller (110V)	1160486
HP4750X Heating Jacket and Controller (230V)	1160496
Double HP4750X Hastelloy to Regulator Connection Kit	1140159
Membrane Area Reducer Kit (25mm)	1140144
Spare Parts	
Alternative O-ring/Gasket Kits, Porous Support Disc, etc.	Spare Parts

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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 crossflow 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**.

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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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