USER'S GUIDE

End Entry Membrane Housings
For Reverse Osmosis

MODEL – 80E

All information included in this publication is based on the latest information available at the time of printing. Pentair reserves the right to make changes at any time without notice and without incurring any obligation whatsoever. Photocopying of this publication by authorized original equipment manufacturers who have purchased directly from Pentair, or by persons using the materials for legitimate educational purposes, is approved by Pentair. Otherwise, all copyright protection afforded by the law applies.

Goa, India. Phone: 91-832-6754400 ● Fax: 91-832-6754412

www.codeline.com

Product Bulletin: 523004 -Rev. B ECN No. 6139 Revision dated – 09/06/2023

PREFACE

The CodeLine 80E Series

Family of Vessels

The CodeLine 80E Series is a standardized family of fiberglass pressure vessels designed for the continuous, long-term use as housings for reverse osmosis membrane elements. Any make of eight-inch nominal diameter spiral-wound element is easily accommodated.

The 80E Series includes five models of different pressure ratings. They are unified in design and have maximum number of parts in common. Each model has the appropriate strength and materials of construction to provide years of continuous use in typical service when properly maintained.

Each model is available in lengths to house, from one to eight, 40-inch long elements and two, four or five 60-inch long elements.

The 80E Series is designed and built in accordance with the engineering standards of the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers (ASME Code). A vessel marked with an ASME Code stamp is accepted worldwide as being built to the highest standards of safety.

Each model in the CodeLine 80E Series has passed rigorous ASME Code qualification tests which require that the vessels do not burst at less than six times their design pressure. Safe use is further assured in that vessels will not fail catastrophically; overpressure is relieved by weeping through the fiberglass shell. Also, every production vessel is hydro-tested to verify structural integrity.

While undertaking regular maintenance/repair/replacement of a pressure vessel it may be necessary to remove the pressure vessel from the bank. Also ensure sufficient spares are available for replacement. Care must be taken in installation/removal of the vessel to avoid damage to the shell. Damage to the shell can result in catastrophic failure and possible injury to personnel. Any corrections or recommendation for improvement for this manual should be addressed to:

CodeLine Division
Pentair Water India Pvt. Ltd.
L/52-55, Verna Industrial Area
Verna, Goa – 403 722. INDIA
Tel: 91-832-6754400
Fax: 91-832-6754412

CONTENTS

SECTION 1 **OPERATION AND MAINTENANCE GUIDE**

- Introduction…… 4
- Safety Precautions…… 5
- Pre-pressurization Checklist…… 6
- Installation Notes…….. 7
- Component Identification…….
  80E 30……. 8
  80E 45 / 60 / 100 / 120…… 9
- Opening The Vessel……. 10
- Replacing Elements……. 13
- Closing the Vessel…….. 15
- Head Dis-Assembling & Assembling
  - 80E30……. 18
  - 80E45/ 60 & 80E100/ 120……. 20
- Preventive Maintenance…….. 27
- Trouble Shooting…… 28

SECTION 2 **INSTALLATION GUIDE**

- Introduction…… . 30
- Handling, Receiving & Storage…… 31
- Mounting Shell & Piping Connections…… 32

SECTION 3 **APPLICATION GUIDE**

- Introduction…… 34
- Suitability For intended Use…… 34
- Elasticity And Mounting Requirements……. 35
- Corrosion…… 36
- Safety…….. 36

SECTION 4 **APPENDIX**

- Warranty Terms & Condition…….. 37
- Registration Card…….. 38

SECTION 1 - OPERATION AND MAINTENANCE GUIDE

INTRODUCTION

MODEL - 80E30

300 PSI

MODEL - 80E45

450 PSI

MODEL - 80E100

1000 PSI

MODEL - 80E60

600 PSI

MODEL - 80E120

1200 PSI

DANGER – High Pressure Device

This vessel may cause loss of life, severe bodily harm, and / or property damage if not correctly installed, operated and maintained. Read and understand all guidelines given in this bulletin before attempting to open, operate or service this vessel.

Failure to follow these guidelines and observe every precaution may result in malfunction and could result in catastrophic failure.

Misuse, incorrect assembly or use of damaged or corroded components can result in explosive release of the end closure.

We recommend that only a qualified technician experienced in servicing high-pressure hydraulic systems, open, close and service these vessels.

This section is a guide to proper operation and maintenance of CodeLine 80E Series pressure vessels. Good industrial practice must be used in applying this information to assure safe vessel use. These guidelines are not intended to relieve the user from full responsibility for correct operation and maintenance of the vessels

For information on application and installation, refer to 80E Series Application and Installation sections.

For technical specifications and dimensions, refer to the Engineering Drawing of each specific model.

The information in all sections must be carefully adhered to in order for the vessels to provide safe, long service life for which it is designed.

SAFETY PRECAUTIONS

DO

- Read, understand and follow every part of this section. Failure to take every precaution may void warranty and could result in explosive head failure.
- Install in an area where water leakage resulting from a vessel or piping malfunction would not damage sensitive equipment, such as electronic components.
- Install protective covering over equipment located below pressure vessels when performing maintenance.
- Verify that head locking components are properly placed and secured.
- Inspect end closures regularly, replace deteriorated components and correct causes of corrosion.
- Follow membrane element manufacturer's recommendations for loading elements into vessel (see Replacing Elements on page no. 13).
- The vessel is designed for continuous use at a pH of 3-11 and for intermittent cleaning (max. 43.2 hours per year at a pH of 2-12).
- Flush the vessel before system shut down. Some feed waters may cause corrosion under static conditions. Flushing with noncorrosive permeate is recommended.

DO NOT

- Operate the vessel outside the recommended operating and cleaning pH range.
- Operate vessel at pressures in excess of their specific rating.
- Service any component until you verify that pressure if fully relieved from the vessel.
- Use corroded components. Use of such components may result in catastrophic failure.
- Pressurize vessel until after visually inspecting to ensure that both locking segments are correctly installed and seated in their grooves.
- Tolerate leaks or allow end closures to be wetted in any way.
- Allow petroleum or silicone-based products to come in contact with membrane elements during installation or maintenance.
- Use petroleum products on Noryl components.
- Pressurize vessel without element in place, unless permeate ports are plugged properly.
- Over-tighten fittings in ports.
- Stand or climb on the pressure vessels or the feed / concentrate or permeate ports.
- Allow force to be applied laterally to feed/concentrate or permeate ports.
- Use the vessel at negative pressure
- Pressurize vessel with Compressed Air.

PRE-PRESSURIZATION CHECKLIST

DANGER – High Pressure Device

Incorrect Installation, Operation & maintenance of these vessels may cause loss of life, severe bodily harm, and / or property damage. Read and understand all guidelines given in this bulletin before attempting to opening, service or operate these vessels.
Failure to follow these guidelines and observe every precaution may result in malfunction and could result in catastrophic failure.

Misuse, incorrect assembly or use of damaged or corroded components can result in explosive release of the end closure.
We recommend that only a qualified technician experienced in servicing high-pressure hydraulic systems, open, close and service these vessels.

This checklist is an aid intended to remind servicing and operating personnel of the detailed guidelines given in the CodeLine 80E series operation and maintenance guide. The checklist alone does not include all the details needed for safe vessel operation. Use the checklist each time any service operation is carried out to ensure that each step is completed before pressurizing the vessel.

MEMBRANE ELEMENTS

- ☐ **Installed** per manufacturer's recommendation.
- ☐ **Feed** flow direction correctly noted and elements correctly oriented.

HEAD ASSEMBLY INTERLOCK

- ☐ **Retaining** Ring groove at each end of the shell is clean, free of corrosion and / or delamination with outboard face of groove true and is in sound condition.
- ☐ **All** components in as-new condition, clean and free of damage or corrosion.
- ☐ **Retaining** Ring is fully seated in the vessel Retaining Ring groove.

ELEMENT INTERFACE

- ☐ **Adapters** installed at both ends and element column.
- ☐ **Thrust** cone installed downstream (concentrate or brine end) of the element column.

HEAD

- ☐ **All** components in as-new condition clean and free of damage or corrosion.
- ☐ **All** components are properly assembled with new, freshly lubricated seals.
- ☐ **Permeate** port locking ring/nut installed.
- ☐ **Head** marked with proper pressure rating for system.

PIPING CONNECTIONS

- ☐ **Properly** aligned (strain free) and secured.
- ☐ **Leak** free.

Assembled by: _____ Date of Assembly: _____
Checked by: _____ Date of Inspection: _____

The following vessels listed by serial number below were serviced under this checklist:

_____ _____ _____ _____ _____
_____ _____ _____ _____ _____

INSTALLATION NOTES

Even though others may install your vessel, you should make few installation checks before system start-up. Vessels must be installed correctly to ensure safe use and long service life.

☐ Check that vessels are mounted on horizontal support frame using compatible black urethane saddles with hold-down straps that are snug & not tight.

☐ Check that each vessel is free to expand under pressure, shell is not rigidly clamped in place, and piping to vessel is not connected using rigid connections.

WARNING

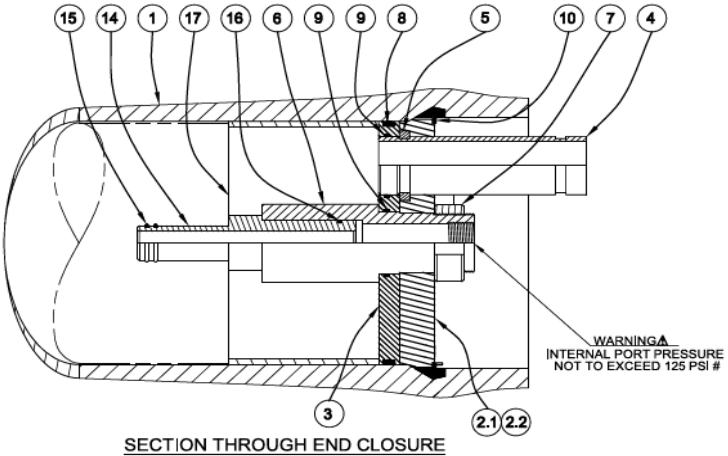
FAILURE TO ALLOW EXPANSION IN DIAMETER OR LENGTH WILL RESULT IN VESSEL DAMAGE.

☐ Check that vessel does not support any other component; that piping manifolds are separately mounted, and that interconnection piping is self supported and connected to the pressure vessel with IPS grooved couplings.

If you have any question about the installation of vessel in your unit, contact your supplier. For installation guidelines, refer to page no. 30-32.

Models	80E30	80E45	80E60	80E100	80E120
Max. Operating Pressure (PSI)	300	450	600	1000	1200
Operating Temp. Range (degree F)	20 – 120				
Factory Test Pressure (PSI) ASME (1.1X)	330	495	660	1100	1320
Factory Test Pressure (PSI) CE/PED (1.5X)	450	675	900	1500	1800
Prototype Min. Qualification Pressure (PSI)	1800	2700	3600	6000	7200
Operating pH Range	3 - 11				
Cleaning pH Range	2 - 12				
Engineering Drawing No. (Coded)	99111	99112	99109	99108	99110

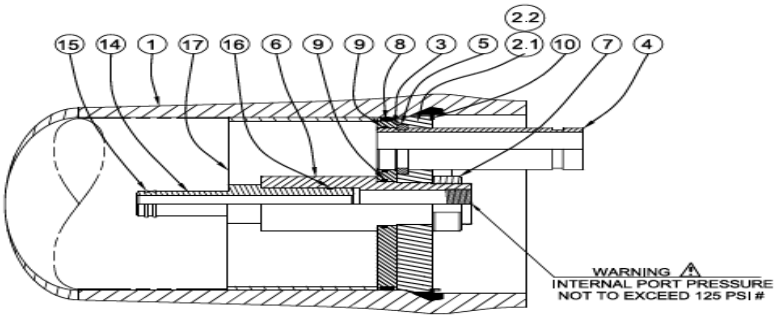
COMPONENT IDENTIFICATION - 80E30



SECTION THROUGH END CLOSURE

DWG REF	QTY	Part No.	DESCRIPTION	MATERIAL
			SHELL	
1	1	Order Section	Shell	Filament Wound Epoxy/Glass composites – Head Locking grooves integrally wound in place.
			HEAD	
2	2	194746	Bearing Plate Assembly	-
2.1	1	51050	Bearing Plate	SB-221 A96061-T6
2.2	1	45070	Danger Label	-
3	2	96003	Sealing Plate	Engineering Thermoplastic
4	2	50607	Feed/ Conc Port	SA-321 316L
5	2	45247	Port Retainer	Stainless Steel
6	2	97980	Permeate Port	Engineering Thermoplastic
7	2	45066	Port Nut	Engineering Thermoplastic
8	2	196223	Head Seal	Ethylene Propylene – O – Ring
9	4	196215	Port Seal	Ethylene Propylene – O – Ring
			HEAD INTERLOCK	
10	2	47336	Quick Release Spiral Ring	SA-479 316
			VESSEL SUPPORT	
11	2**	52169	Saddle	Engineering Thermoplastic
12	2**	45042	Strap Assy.	
13	4***	46265	Strap Screw	
			ELEMENT INTERFACE	
14*	2	A/R	Adapter	Engineering Thermoplastic
15*	4	A/R	PWT Seal	Ethylene Propylene – O – Ring
16*	2	196222	Adapter Seal	Ethylene Propylene – O – Ring
17*	1	45069	Thrust Ring	Engineering Thermoplastic
*Not shown in above section view. **3 & ***6 each furnished with length code 4,5,6,7, & 8.				

COMPONENT IDENTIFICATION
80E45 / 60 & 80E100 / 120



SECTION THROUGH END CLOSURE

DWG REF	QTY	DESCRIPTION	MATERIAL	80E45 / 60	80E100 /120
SHELL					
1	1	Shell	Filament Wound Epoxy/Glass composites – Head Locking grooves integrally wound in place.	Order Section	Order Section
HEAD					
2	2	Bearing Plate Assembly	-	80E45: 194747 80E60: 194748	194749
2.1	1	Bearing Plate	SB-221 A96061-T6	80E45:51051 80E60: 51052	47317
2.2	1	Danger Label	-	45070	
3	2	Sealing Plate	Engineering Thermoplastic	96003	
4	2	Feed/ Conc Port	SA-321 316L / SA-790 UNS S32750	50567	50556
5	2	Port Retainer	CF8M Cast SS, Two-Place Set	45090	
6	2	Permeate Port	Engineering Thermoplastic	50569	50558
7	2	Port Nut	Engineering Thermoplastic	45066	
8	2	Head Seal	Ethylene Propylene – O – Ring	196223	
9	4	Port Seal	Ethylene Propylene – O – Ring	196215	
HEAD INTERLOCK					
10	2	Quick Release Spiral Ring	SA-479 316	47336	
VESSEL SUPPORT					
11	2**	Saddle	Engineering Thermoplastic	52169	
12	2**	Strap Assy.		45042	
13	4***	Strap Screw		46265	
ELEMENT INTERFACE					
14*	2	Adapter	Engineering Thermoplastic	A/R	
15*	4	PWT Seal	Ethylene Propylene – O – Ring	A/R	
16*	2	Adapter Seal	Ethylene Propylene – O – Ring	196222	
17*	1	Thrust Ring	Engineering Thermoplastic	45069	45069
*Not shown in above section view. **3 & ***6 each furnished with length code 4,5,6,7, & 8.					

OPENING THE VESSEL

STEP-BY-STEP GUIDE

Step 1. Relieve Pressure

1. Shut off all sources of pressure and relieve pressure from the vessel, following the system manufacturer's recommendations.

Step 2. Disconnect Permeate Port

1. Disconnect permeate piping as required at nearest convenient joint, being careful not to place undue stress on the threaded connections of the permeate port(s).
   Caution: DO NOT tap on fittings as this could damage the ports.

Step 3. Examine End Enclosure

1. Examine enclosure of vessel for corrosion. Metal oxidation products and mineral deposits can interfere with vessel disassembly. If any is evident, proceed as follows:

b) Loosen any deposits with a small wire brush and / or a medium grade piece of ScotchBrite™.

c) Flush away loosened deposits with clean water.

Loosening deposits

Step 4. Removing Head Retaining Ring

1. No special tools are required for this operation. Engage your fore finger in the end tab of the retaining ring, lift it up and out of the retaining ring groove in the shell.

Lifting end of retaining ring out of groove

2. Remove the retaining ring from the retaining ring groove in the shell. This is accomplished by running your fingers behind the retaining ring as it continues to exit the groove.

3. If the retaining ring is difficult to remove, try soaking with a warm release agent such as LPS or WD40, being careful to avoid any contamination of membrane element. Take care to avoid hitting or levering against the vessel, as this could result in delamination.

Removing the retaining ring from the groove

4. Remove the retaining ring from the stainless steel groove in the shell. This is accomplished by running your figure behind the retaining ring as it continues to exit the groove.

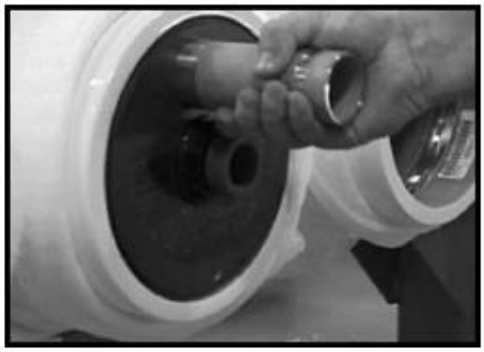
OPENING THE VESSEL

Step 5. Removing Head Assembly

A. *Removing head assembly by Hand*

1. Gently tap the Head Assembly with a rubber mallet.
2. Grasp feed/concentrate port and pull head straight out. A sharp forceful tug may be required to start head assembly moving.
3. If the head seal remains in the vessel bore, it should be removed at this time.

Repeat above procedure for the opposite end of the vessel.



NOTE

It may be necessary to rock the head slightly and / or tap the head inboard to break head seal bond.

B. *Removing head assembly using tool (Part # 94101)*

1. The Head Removal Tool is made up of 3 components.
   a) Plate b) Bolt c) Nut with hand grip
2. Hold the plate against the face of the vessel, engage the bolt of the head puller in the 1” FNPT connection of the permeate port.
3. Run the nut with hand grip, on the Head puller bolt and continue to tighten the nut till the head comes out.

Removing Head Assembly using Head Removal Tool

Repeat above procedure for the opposite end of the vessel.

WARNING

Read all guidelines in this section before attempting to open the vessel. Do not attempt to service any component without first verifying that vessel PRESSURE is fully relieved from the vessel. Attempting to remove any component before pressure is relieved may result in EXPLOSIVE release of the head.

OPENING THE VESSEL

C. ***Removing head assembly using tool (Part # TO-10273)***

Step 1:

The Head removal tool (P/N: TO-10273) consists of three parts (applicable to 8" models only). a.) Base Plate c) Stud Threaded (2 no's) d) T-Socket (2 no's)

Step 2:

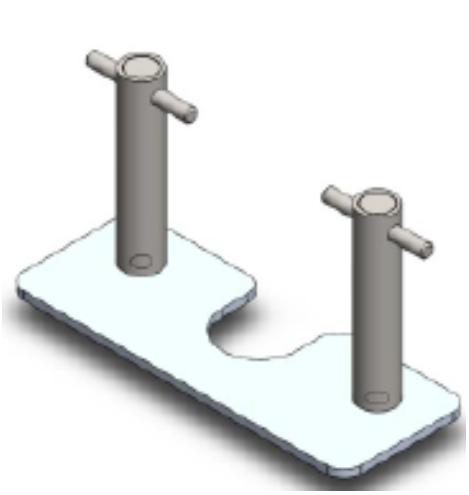
Engage the stud in the threaded holes provided on the bearing plate.

Step 3:

With the plate against the face of the vessel, engage the T-Socket with the threaded studs.

Step 4:

Run the hand grip on the T-Socket's and continue to tighten (clock-wise) till the head assembly comes out.



WARNING

Read all guidelines in this section before attempting to open the vessel.
Do not attempt to service any component without first verifying that vessel PRESSURE is fully relieved from the vessel. Attempting to remove any component before pressure is relieved may result in EXPLOSIVE release of the head.

REPLACING ELEMENTS

IMPORTANT

Read all parts of this section before replacing elements. These procedures are provided for general information only. Elements should be installed in accordance with the element manufacturer's recommendations.
Always remove and install elements in the direction of feed flow. The feed end (upstream end) is the end plumbed most directly to the pump.
A record of element serial numbers and locations should be made and checked during loading.
Do not scratch or damage vessel bore when removing or installing elements.

Preliminary Steps

Do not proceed with step by step instructions until…

1. All pressure has been relieved from the vessel, following system manufacturer's recommendations.
2. Both heads have been removed from vessel following step by step instructions in the "Opening the Vessel" section.

Step 1. Remove Element Interface Hardware.

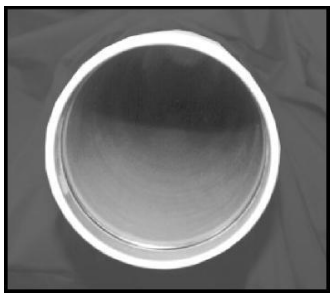
1. Remove thrust ring from the downstream (concentrate) end.
2. Remove adapters from elements at each end.

Step 2. Element Removal

1. Remove elements from the vessel following element manufacturer's instructions. Clean off any excess lubricant from vessel inside diameter before removing elements.

Step 3. Element Loading

1. Examine the inside diameter of the vessel for scratches or imperfections that may affect sealing capability of head or element seals. Corrosion deposits or other foreign matter, including any excess lubricant, should be removed as described in Section – Closing the Vessel.
2. Flush out the vessel with clean water to remove any dust and debris.



Examining for scratches

3. Examine membrane element surfaces for any imperfection which could scratch the vessel bore. Pay particular attention to edges of anti-telescope device (ATD/brine seal carrier).
4. Using an approximate 50% mixture of glycerin in water, lubricate the inside of the vessel. This may best be accomplished using a suitably sized swab soaked in the mixture. This procedure will ease membrane element loading and reduce chance of scratching the vessel bore.

NOTE:
If the brine seal is not installed on the element and the element supplier does not specify otherwise, a brine seal should be placed on the upstream end of the elements. Open side of a seal must face upstream.

5. Load the first element into the upstream end of the vessel. Leave a few inches of the element projecting from the vessel to facilitate interconnection to the next element.
6. Apply a light film of a non-petroleum based lubricant to the interconnector O-ring. (The amount of lubricant should be just enough to give a lustre to the O-ring. Excess lubricant must be removed to prevent possibility of element contamination).
7. Assemble the interconnector to the loaded element.
8. Line up the next element to be loaded and assemble it to the interconnector already assembled on the first element.
9. Push both elements into the vessel until a few inches are projecting from the vessel. Repeat loading process until all elements are installed.

CAUTION

Maintain element alignment carefully during assembly procedure. Do not allow element weight to be supported by interconnector.

Mis-alignment can result in damage to interconnectors or permeate tubes or to element outer surface.

Take care to avoid pushing elements too far as it can be difficult to push the stack in a reverse direction.

Step 4. Install Element Interface Hardware

1. Assemble adapter to element permeate tube at each end of vessel.

   (Connect the central (permeate) tube of the membrane element stack, with an adapter on each end, to the permeate port in the head at both ends of vessel. Pressurizing vessel without both adapters installed could result in explosive head failure)
2. Install thrust ring at downstream end.

Installing Thrust Ring

CAUTION

Install the thrust ring at the downstream end. Serious damage may result if thrust ring is not installed in correct location.

Ensure thrust ring is clean before installation.
Thrust ring required no orientation; simply push into shell.
For step-by-step instructions on vessel closure, refer to the Closing Vessel, page 15.

CLOSING THE VESSEL

WARNING

Read all guidelines in this section before attempting to close the vessel.

CHECK THE HEAD ASSEMBLY FOR CORROSION AS DESCRIBED IN THE HEAD REBUILDING SECTION. CORRODED PARTS CAN RESULT IN CATASTROPHIC FAILURE.

Do not pressurize vessel until after visual inspection to ensure that retaining ring is fully seated.

Never attempt to repair a fiberglass shell.

Preliminary Steps

Do not proceed until…

1. Elements and adapters have been installed in the vessel following guidelines in "Replacing the Elements" section.
2. Head has been checked for correct component assembly by following step-by-step instructions in the Head Rebuilding section.
3. Vessel has been shimmed to prevent movement of the membrane elements if required. **See *Trouble Shooting* section** for a description of when shimming is required.

Step 1. Inspect Shell Inside Surface

1. Inspect the vessel inside surface for any corrosion deposits or other foreign matter. If any are found, clean the surface as follows:

Cleaning inside the vessel

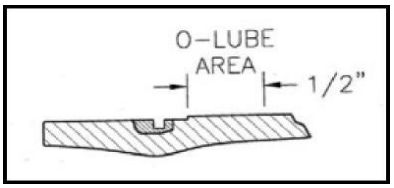
Using a medium or finer grade of ScotchBrite™ and a mild soap solution, clean each end of the vessel inner surface upto 8" from each end of the vessel.

Rinse away all loosened deposits from the shell inside surface using clean fresh water.

2. Inspect the vessel inside surface for scratches or other damage that could cause leaks. Vessels that leak must be replaced.

Step 2. Shell & Head Lubrication

1. Work O-ring lubricant into shell area behind the retaining ring groove and approximately ½" into the vessel I.D.
2. Ensure entire head seal is covered with a thin layer of O-ring lubricant, with no dirt or dust contamination.



WARNING

Any remaining lubricant should be cleaned from the vessel bore before applying fresh lubricant. Glycerine is a commercially available lubricant that will not foul membranes.

CLOSING THE VESSEL

Step 3A. Installation of Head Assembly

1. Align any previously placed index marks on head assembly and vessel body. This will ensure correct alignment for port connections. Do not rotate head assembly after insertion into vessel as this may cause head seal to become detached.

2. Hold head assembly square to axis of shell and slide it straight in until a slight resistance is felt.

3. Using both hands, firmly push head in as far as it will go (a sharp, forceful thrust may be necessary to push head seal into vessel bore.) When head is in correct position, entire retaining ring groove will be exposed.

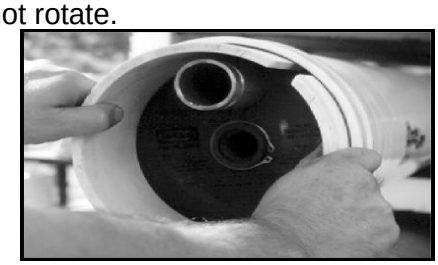
Installing Head Assembly by hand

NOTE

In some installations it may be advisable to tighten a system-required permeate port nipple or fitting into the Permeate port before the head is assembled into the vessel.
Do not tighten a component into the Permeate port more than one turn past hand tight.

Step 3A. Installation using Tool

1. Align any previously placed index marks on head assembly and vessel body. This will ensure correct alignment for port connections. Do not rotate head assembly after insertion into vessel as this may cause head seal to become detached.
2. Hold the head assembly square to axis of the shell and slide it straight in until a slight resistance is felt.
3. Slide tool (p/n 50733) into shell just behind the head.
4. Tap tool alternating around circumference with a dead-blow hammer until retaining ring groove is fully exposed.
5. Remove tool by pulling straight out. Do not rotate.



Step 4. Install Head Interlock

1. Carefully wipe out any debris or moisture from the head Retaining ring groove. The groove must be clear and dry before proceeding.
2. With the head assembly installed in the shell, place the tip of the head Retaining ring in the retaining ring groove. (The non bent tab end)
3. Begin pushing the retaining ring into the groove as you rotate your hand around the I.D. of the shell.

Installing Head Retaining ring

4. Continue until the entire retaining ring is installed in the groove.
5. Verify that the retaining ring is fully seated in the groove before proceeding.

CAUTION

Incorrect assembly or installation can result in EXPLOSIVE HEAD failure.

CLOSING THE VESSEL

CAUTION

Do not tighten a component into permeate port more than one turn past hand tight.

DO NOT PRESSURIZE THE VESSEL WITHOUT ELEMENTS INSTALLED.

Do not pressurize vessel until verifying that the Head Retaining Ring is properly installed.

Step 5. Reconnect Permeate Piping

1. Reconnect manifold piping to the vessel. Using teflon tape or anaerobic sealant on all threaded connections will help ensure a leak-free assembly.

Step 6. PRE_PRESSURIZATION CHECKS

It is vitally important that the following checks be carried out before any attempt is made to pressurize the vessel.

It is recommended that the Pre-Pressurization Checklist (Page-05) be used to systematically verify that all steps have been performed.

HEAD ASSEMBLY

Verify the following at each end of the vessel:

1. Head assembly is in good condition, with no evidence of damage or corrosion. See the sections on Head Rebuilding and Maintenance.
2. Port nut is snug (left-hand thread).
3. Head retaining Ring is properly placed.

MEMBRANE ELEMENTS

Verify that…

1. Elements are installed in the vessel.
2. Element adapters are installed at each end of the vessel.
3. Thrust ring is installed at downstream end of the vessel.

PIPING CONNECTIONS

1. Check all piping connections to ensure that they will provide a leak-free seal.

Step 7. Pressurization

1. After following the above pre-pressurization checks, pressurize vessel in accordance with element manufacturer's specifications.
2. Vessels should be filled slowly to assist trapped air in escaping.
3. Vessels should be pressurized slowly to avoid damage to membrane elements and vessel components.

HEAD DIS-ASSEMBLING & ASSEMBLING – 80E30

NOTE

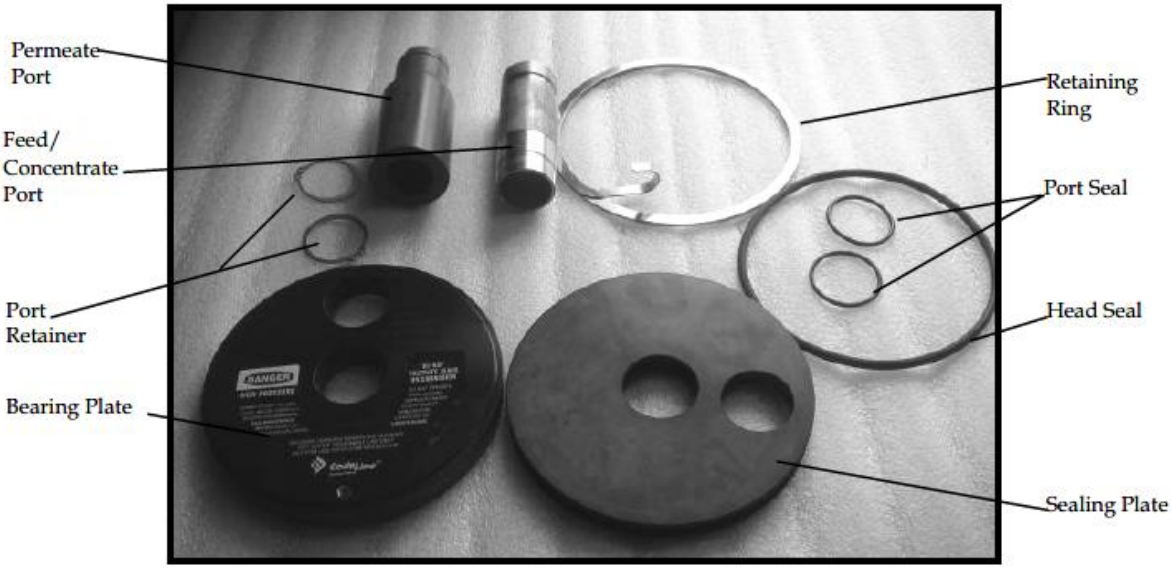
Read all guidelines in this section before attempting to rebuild the head.

Head rebuilding should be performed in a clean work area. Dust or dirt on O-rings or other parts can scratch inner surfaces and cause subsequent leakage.

Replace any components not in "as-new" condition. Re-using corroded or damaged components can result in explosive head failure.

WARNING

DO NOT SERVICE ANY COMPONENT UNTIL YOU VERIFY THAT PRESSURE IS FULLY RELIEVED FROM THE VESSEL.
REPLACE ANY COMPONENTS NOT IN "AS-NEW" CONDITION. REUSING CORRODED OR DAMAGED COMPONENTS CAN RESULT IN CATASTROPHIC FAILURE.
SNAP RINGS MUST BE FULLY SEATED AT BOTTOM OF GROOVES PROVIDED. INCORRECT ASSEMBLY CAN RESULT IN CATASTROPHIC RELEASE OF PORT.



Head component identification (80E30) – head disassembled

80E30

Preliminary Steps

Do not proceed until…

1. All pressure has been relieved from the vessel, following system manufacturer's recommendations.
2. Head has been removed from the vessel following guidelines in "Opening the Vessel" section.

NOTE

Refer to Pages 8 and 18 for head Component Identification

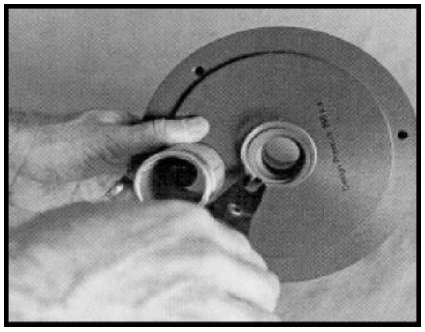
CAUTION

It is recommended that safety glasses be worn during installation of snap ring.

TO DIS-ASSEMBLE HEAD

Step 1. Removing Permeate Port

1. Remove snap ring using snap ring pilers.

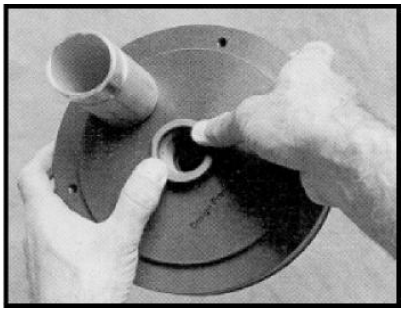


Snap Ring Removal Using Snap Pilers

NOTE

If necessary, ports may be tapped with a rubber mallet to ease removal.

2. Remove permeate port by using pressing out from threaded end.



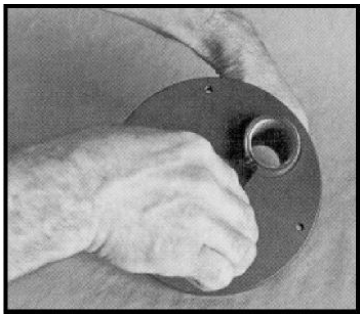
Pressing out permeate port

Step 2 – Remove Sealing Plate

1. Hold feed/concentrate port and bearing plate stationary and rotate sealing plate slightly to break seal. Remove sealing plate.

STEP 3 REMOVE FEED/CONCENTRATE

1. Remove snap ring using snap ring pliers.



Snap ring removal with pilers

2. Remove feed/concentrate port from bearing plate.

Steps for rebuilding the heads of the 80E30 continue on OM-20.

HEAD DIS-ASSEMBLING & ASSEMBLING – 80E45/60 & 80E100/120

NOTE

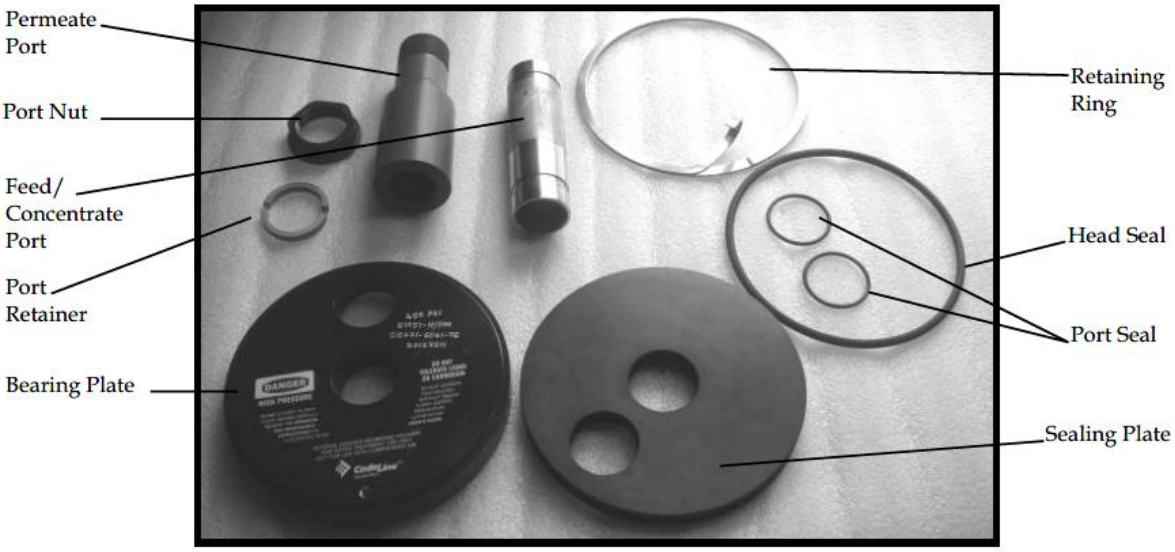
Read all guidelines in this section before attempting to rebuild the head.

Head rebuilding should be performed in a clean work area. Dust or dirt on O-rings or other parts can scratch inner surfaces and cause subsequent leakage.

Replace any components not in "as-new" condition. Re-using corroded or damaged components can result in explosive head failure.

WARNING

DO NOT SERVICE ANY COMPONENT UNTIL YOU VERIFY THAT PRESSURE IS FULLY RELIEVED FROM THE VESSEL.
REPLACE ANY COMPONENTS NOT IN "AS-NEW" CONDITION. REUSING CORRODED OR DAMAGED COMPONENTS CAN RESULT IN CATASTROPHIC FAILURE.
SNAP RINGS MUST BE FULLY SEATED AT BOTTOM OF GROOVES PROVIDED. INCORRECT ASSEMBLY CAN RESULT IN CATASTROPHIC RELEASE OF PORT.



Head component identification (80E45/60, 80E100/120) – head disassembled

80E45/60 & 80E100/120

Preliminary Steps

Do not proceed until…

1. All pressure has been relieved from the vessel, following system manufacturer's recommendations.
2. Head has been removed from the vessel following guidelines in "Opening the Vessel" section.

NOTE

Refer to Pages 9 and 20 for head Component Identification

Step 1. Removing Permeate Port

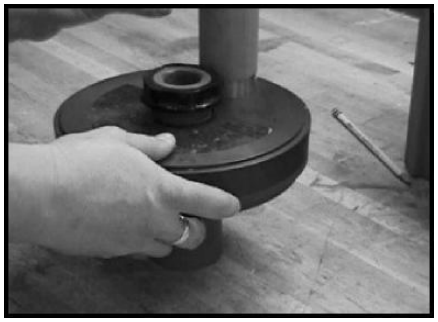
1. Remove the permeate port by unscrewing left-hand thread.

Removing the Permeate Port (left hand threaded)

NOTE

If necessary, ports may be tapped with a rubber mallet to ease removal.

2. Remove permeate port by pressing out from threaded end.



Pressing out permeate port

Step 2. Removing Sealing Plate

1. Hold feed/concentrate port and bearing plat e stationary and rotate sealing plate slightly to break seal.
2. Remove sealing plate.

Step 3. Removing Sealing Plate

1. Press long, exposed end of feed/concentrate port further into bearing plate to free the port retainer set.
2. First remove port retainer set (2 pieces), then feed/concentrate port from bearing plate.

Removing port retainer set

Steps for rebuilding the heads of the 80E45/60, 80E100/120 continue on

Step 4. Removing Head Seal

1. Using a small screw driver or similar tool remove the o-ring. However, do not damage the sealing surface in any way as it may lead to leakage.

Removing Seals

It is recommended that all seals be replaced each time the heads is assembled.
It is recommended that on 80E30 vessels, the snap ring be replaced each time head is assembled.

Component Cleaning and examination

Step 1. Wash Components

1. Wash all components in fresh water.
2. Blow components dry with compressed air, if available. Otherwise wipe dry with a dry, lint-free cloth.

CAUTION

Read all guidelines in this section before making any decisions on components structure or corrosion problems and treatment.

This section is intended only to provide guidelines in dealing with corrosion or component damage. In combination with good industrial practice, these guidelines provide a basis for safe system operation.

Any condition not covered in this section should be referred to Pentair.

Corrosion in this context includes metal oxidation products and mineral deposits.

Step 2 Initial Component Inspection

2. Examine all components for any damage that could affect structural strength or sealing properties.
3. Replace any parts considered to be structurally unacceptable.

CAUTION

Feed and Concentrate ports and attachments to the shell must be carefully inspected to ensure that connections and sealing materials are sound and tight. Any questions or evidence of deterioration of these areas should be referred to Pentair Engineers.

Other than head seals, adapter seals & PWT seals replacement, field repair should not be attempted by user maintenance personnel without first contacting the manufacturer for guidance.

The following example indicates when replacement is required.

A. Feed/ Concentrate port bent or distorted
B. Permeate port or Port Nut internal thread stripped or over-strained.
C. Bearing Plate dented or distorted or with anodizing removed (possibly from being dropped or hit).
D. Sealing plate cracked, distorted or with sealing area damaged.
E. Retaining Ring bent or damaged.

Any other details considered to be a potential problem should be referred to Pentair. If any component is cracked, softened or discolored, it may indicate a chemical resistance problem. These components must be replaced. Alternate materials may be required in these applications. Contact Pentair for a solution.

Step 3. Evaluating Corroded Metal Components

This procedure applies to the following parts:

A. Bearing Plate
B. Retaining Ring
C. Feed/ concentrate port
D. Port Retainers

1. Examine these components for corrosion. For any components not in "as-new" condition, proceed as follows:

A. Loosen any large deposits with small wire brush.

B. Place components in shallow container of soapy water and scrub entire surface with medium grade ScotchBrite™ until all corrosion is removed.

C. Rinse components clean with fresh water.

D. Blow components dry with compressed air, if available.

E. Re-examine components for damage that could affect structural strength or sealing properties. Any components not in "as-new" condition must be replaced.

F. Inspect components for any condition that might have promoted corrosion, (e.g. external damage, inappropriate material selection, etc.)

CAUTION

This procedure for evaluating corroded components is to be used on any corroded metal parts. If this fails to bring any component to "as-new" standards, the part must be replaced.

Step 4. REMOVING DEPOSITS FROM Engineering Thermoplastic Components

CAUTION

The following procedure should be used on all Engineering Thermoplastic Components contaminated by minerals or other foreign matter. If any component cannot be brought to "as-new" standards, it must be replaced.

This procedure applies to the following components:

A. Port Nut (80E45/ 60/ 100/ 120 only)
B. Permeate Port
C. Sealing Plate
D. Adapter

1. Examine all plastic components for mineral deposits or other foreign matter. If any are found, proceed as follows:
   A. Place components in a shallow container of soapy water and scrub entire surface with medium grade ScotchBrite™ until all foreign matter is removed.
   B. Rinse components clean with fresh water.
   C. Blow components dry with compressed air, if available.
   D. Re-examine components for any damage that could affect structural strength or sealing properties. Any components not in "as-new" condition must be replaced.

HEAD – DIS-ASSEMBLING & ASSEMBLING – 80E30

To Re-Assemble Head

WARNING

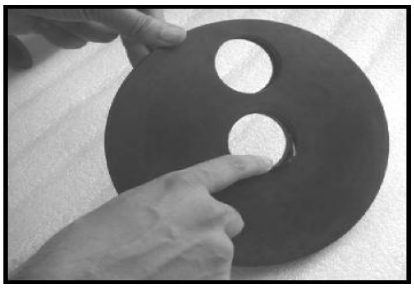
Head must be carefully assembled following these instructions. Incorrect assembly can result in CATASTROPHIC failure.

CAUTION

It is recommended that all seal be replaced each time the head is assembled. A seal replacement kit is available from Pentair.

Step 1. Lubricate and Install Seals

1. Cover each seal with a thin, even layer of O ring lubricant.
2. Install port seals in sealing plate.



Installing Port Seals

NOTE

Steps for rebuilding the head of the 80E30 only continue on page OM-24. Steps for rebuilding the head of the 80E45/60, 80E100/120 continue page OM-26.

STEP 2 INSTALL FEED/CONCENTRATE PORT

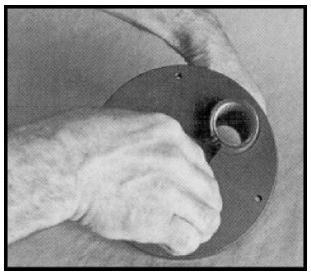
1. Hold the bearing plate so that the counter bore in the off center hole is facing toward you. From the other side, insert the smaller, machined end of the stainless steel feed/concentrate port through the off-center hole.

Installing Fees/ Concentrate port

CAUTION

It is recommended that safety glasses be worn during installation of snap ring.

2. Install snap ring into groove in feed/concentrate port using snap ring pliers.



Port being fitted using snap ring pliers

STEP 3 INSTALL SEALING PLATE

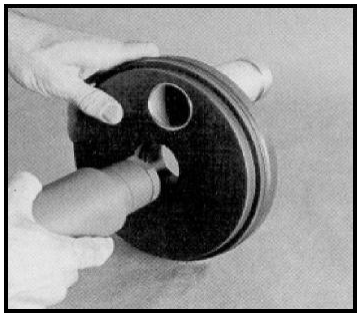
1. With its larger diameter facing the bearing plate, press the sealing plate onto the machined end of the feed/concentrate port.

2. Rotate sealing plate until the two center holes are aligned.

STEP 4 INSTALL PERMEATE PORT

1. From sealing plate side, insert threaded end of permeate port through bearing/sealing plate combination. Press firmly until permeate port bottoms on sealing plate.

2. Install snap ring into groove on outer end of permeate port using snap ring pliers.



Permeate Port being inserted

NOTE

Head assembling of the 80E30 is now complete.

80E45/60, 80E100/120 ONLY

(Cont'd from page 24)

2. Install the port retainer set into the groove in the machined end of the feed/concentrate port. Pull port back until retaining ring set bottoms in bearing plate recess.

Installing port retaining set

STEP 3 INSTALL SEALING PLATE

1. Hold these components together so that the retaining ring set remains firmly seated. With its larger diameter facing the bearing plate, press the sealing plate onto the machined end of the feed/concentrate port.
2. Rotate sealing plate until the two center holes are aligned.

STEP 4 INSTALL PERMEATE PORT

1. From sealing plate side, insert threaded end of permeate port through bearing/sealing plate combination. Press firmly until permeate port bottoms on sealing plate.

2. Thread port nut (left-hand thread) onto permeate port. Tighten until snug.

Installing permeate Port

NOTE

Head assembling of the 80E45/60 and 80E100/120 is now complete.

PREVENTIVE MAINTENANCE

Corrosion prevention is essential for the maintenance of safe operating conditions and to ease membrane element servicing.

Attention to the points listed below will enhance long-term safe operation and will ease servicing.

For suggestions on cleaning corrosion deposits from the vessel inside surface, refer to “Closing the Vessel” section.

For suggestions on cleaning corrosion deposits from head components, refer to the “Head Rebuilding” section.

PREVENTIVE CHECKLIST

- [ ] End closures. Inspect for components that may have deteriorated. Replace as needed.
- [ ] Keep external head assembly components as dry as possible.
- [ ] Do not tolerate leaks.
- [ ] Ensure that protective coating are intact. Exposed metal may promote corrosion.
- [ ]

CAUTION

Any leakage indicates a potentially dangerous condition. Failure to eliminate leakage may void the warranty and could result in vessel failure.

TROUBLE SHOOTING

This section is intended only to provide guidelines for dealing with problems that might arise while working with CodeLine Series pressure vessels.

These guidelines are not in any way a replacement for the good industrial practice required to ensure safe operation. We recommend that only a qualified engineer, experienced in servicing high pressure hydraulic systems, carry out the following tasks.

Preliminary Inspection

Inspect the vessel at each end for corrosion, which may interfere with head assembly removal. If corrosion is evident, proceed as follows:

1. Loosen any deposits with a small wire brush and/or a medium grade piece of ScotchBrite™.

Loosening Deposits

WARNING

Do not use a wire brush on components made from Engineering Thermoplastic.

2. Flush away loosened deposits with clean water.
3. Proceed with instructions given in "Opening the Vessel" section.

Difficulty in Opening Vessel

NOTE

Recommendations listed here are intended only as a guide. If the head assembly is still difficult to remove after all recommendations have been followed, call Pentair for technical assistance.

Head Retaining Ring

1. Will not release from the Retaining Ring Groove.

A. Apply penetrating fluid (such as WD-40 or LPS-1) to interfacing areas of retaining ring.

B. With a screwdriver handle or similar tool, tap the retaining ring to release the bond.

C. Again, attempt to remove the retaining ring.

Applying penetrating fluid

CAUTION

When applying penetrating fluid, be careful to avoid element contamination.

TROUBLE SHOOTING

Sudden Drop in Permeate quality

If a system is started and stopped frequently and no provision is made to raise the pressure slowly, movement of the membrane column may damage O-ring seals and reduce permeate quality.

If the quality of the permeate suddenly drops, and poor membrane performance is not suspected, remove the heads per instructions in the Users Guide (See "OPENING THE VESSEL" section on page nos. 10-12). Inspect these O-ring seals carefully for breakage or other damage. If the seals have rolled out of the groove, or are damaged, this may indicate excessive movement during start-up and shutdown. To overcome this problem, the vessel should be shimmed to minimize this movement. Follow the procedure for shimming as given below:

SHIMMING

Shimming is accomplished by placing spacers between the adapter and the hub on the permeate port on the upstream end of the vessel. When done properly, shimming will prevent excessive movement of the membrane elements and the adapters, thus preventing potential damage of the O-ring seals. The spacers used for shimming are shaped like a plastic washer and are 0.20 inches thick.

The suggested procedure for shimming is as follows:

1. With the membrane properly loaded, install the adapter in the last element and place the thrust cone on the head for the downstream end of the vessel. (See Replacing Element section on page nos. 13).
2. Install the head in the downstream end of the vessel following Steps 1 through 4 of the section entitled Closing Vessel on page nos. 15-17.
3. Remove the product water tube seals from the upstream adapter and the head seal.
4. Push the straight end of the adapter into the permeate hub, just far enough so that it is held by the adapter seal.
5. Line the adapter up with the product water tube on the first element and install the head fare enough into the vessel so that you can place a locking ring segment in the groove.
6. Carefully remove the head and observe the space between the hub of the adapter and the face of the permeate port. Determine the number of spacers necessary to fill this space.
7. Remove the adapter and place the product water tube seals. Insert the adapter in the product water tube of the first element.
8. Slide the number of spacers determined in Step 6, over the end of the adapter.
9. Now close the vessel according to the "Closing the Vessel" section which begins on page no. 15

Vessel Shimming

SECTION 2 - INSTALLATION GUIDE

Introduction

Proper vessel handling and installation are important to safe use and long vessel life. These guidelines outlined herein should be carefully followed; however, they are intended only as guidelines and do not relieve the purchaser from full responsibility for proper inspection, handling and installation. Damage due to improper handling or installation is the sole responsibility of the purchaser.

Improper assembly, misuse or corrosion damage can result in mechanical failure, property damage and serious injury or death. *Read and follow all instructions carefully*. Pay particular attention to the safety precautions given in this **Installation Guide** section.

Regardless of when and by whom your vessel may have been installed, there are a few quick checks you should make before use. Check that each vessel is:

- Mounted with compliant material (Polyurethane Saddle) between the fiberglass shell and any rigid frame.
- Free to expand under pressure – shell not clamped rigidly in place, no rigid piping connection to port fittings.
- Not used in any way to support other vessels / objects.

HANDLING, RECEIVING AND STORAGE

Fiberglass reinforced plastic (FRP) Pressure vessels are extremely rugged and durable. They are designed for safe, long-term service when they are handled and installed properly. However, damage to the vessel shell or related components from improper handling or installation could result in malfunction or explosive head failure while in service. Therefore exercise the following precautions whenever handling vessel.

1. Never lift or move a vessel by placing anything inside it. The vessel is durable and ideally suited to its purpose, but careless handling can permanently damage it.
2. Be careful not to scratch the inside wall of the shell, especially in the sealing area inboard of locking segment groove near the end.
3. Do not drop vessel or allow it to hit hard on the ground or against other objects.
4. Do not apply undue stress to shell.
5. Before using a forklift to handle the vessel, pad the forks to lessen the chance of damaging the shell. Severe scratches or gouging of the vessel can result in failure of the vessel wall.
6. Do not allow undue stress to act on the Feed/Concentrate port, which might cause impact damage to the port area, leading to leakage. Do not use the Feed/Concentrate port or the permeate port as a tool to lift the pressure vessel or as a support to manifolds. Manifolds should be self-supporting.

NOTE ON IMPACT DAMAGE

Exterior vessel damage can lead to early vessel failure. Damage received in shipment should be reported to the shipping company immediately upon receipt minor damage such as scratches that go no deeper than the paint may be acceptable. Call the Pentair customer service department for advice if in doubt.

STORAGE

Pentair recommends storing the vessel in the received packing or in a secure place. Vessel should not be stored in such a manner that they will roll over and get damaged.

If ambient or storage temperature drops below or increase above the operating temperature than do not use such vessel under same condition wait to normalize the temperature within the operating range.

MOUNTING SHELL & PIPING CONNECTION

NOTE

If mounting vessel for the first time, see "piping recommendations for CodeLine End-port vessel", Page no, 33

This section is concerned with the mounting of CodeLine Models 80E Series pressure vessels.

These guidelines must be integrated with any additional procedure required for your specific installation.

Installation Guidelines

1. Provide adequate room for servicing at both ends of vessel. Elements are installed from the upstream end (feed), pushed through towards the downstream end (concentrate) and, eventually, removed from the downstream end.
2. Follow all applicable Handling Guidelines.
3. Position each vessel on its mounting frame such that it is centered between headers.

NOTE

It is important that each vessel be placed to minimize any strain on piping / tubing that connects a vessel to a header. Normally each vessel should be centered in the frame with the feed and concentrate ports positioned such that piping / tubing connections can be made easily, without undue strain at each end of the vessel.

4. Mount vessels on urethane saddles (provided with the vessel) positioned in line with pre-drilled frame holes for –1 through –3 vessels. Holes for the mounting straps should be drilled at approximate center span 'S'. For –4 and –8 vessels, holes for the mounting straps should be drilled at span 'S' from the middle of the vessel and a third saddle, with the strap, should be placed at mid span. These dimensions are shown on the corresponding engineering drawing.

WARNING

DO NOT MOUNT VESSEL RIGIDLY. RESTRICTED EXPANSION CAN RESULT IN DAMAGE TO THE VESSEL. SEE ELASTICITY AND MOUNTING REQUIREMENTS IN THE APPLICATION SECTION FOR FURTHER DETAILS.

MOUNTING SHELL & PIPING CONNECTION

1. Place mounting straps over vessel with plastic strip against vessel.
2. Position screw through the frame mounting holes into strap nuts and run up to the frame finger tight.
3. Connect vessel feed piping (See Piping Recommendations for more info)
4. Using a wrench, tighten mounting bolts one additional full turn. This should result in 25-50 lbs-in. of torque.

CAUTION

To avoid damage to vessel shell,
DO NOT over-tighten mounting nuts.

WARNING

CodeLine straps are designed to secure the vessels during operation. They are not designed to handle all loads that might occur during shipment. Appropriate vessel restraint should be employed considering such factors as the mode of shipment, distance to be traveled and design of the system.
The vessels and frame should be blocked to prevent any differential movement which could be caused by the forces experienced during shipment.

PIPING CONNECTIONS

The following are suggested guidelines to ensure that the vessel is allowed to expand and is easily serviced:

1. Support the header independently; support the branch with the header and the vessel.
2. Include an expansion loop in the branch connection to allow for:

A. Elastic growth in vessel length

B. Thermal growth in vessel length

C. Sagging of the vessel (which can occur even when supported at recommended span)

3. The recommended branch connection is a U-bend pipe with flexible connections at each end, or a flexible hose.
4. The total weight of the branch connection and fittings should not exceed 16 lbs. for feed/concentrate and 8lbs. for permeate port for 80E Series vessels.

SECTION 3 - APPLICATION GUIDE

Introduction

This Application Guide, together with the Installation Guide and the Operation and Maintenance Guide, outlines the general conditions for safe use of CodeLine End-ported pressure vessels. Because of the considerable risk inherent in high pressure vessels, it is the purchaser's responsibility to carefully evaluate each specified application to ensure that the CodeLine® Side-ported vessel selected is appropriate to that application.

Pentair will assist the purchaser in determining the suitability of the standard vessel for their specific operating conditions. For non-standard applications, alternate materials are available on special order. The final determination, however, including evaluation of the standard materials of construction for compatibility with the specific environment, is the responsibility of the purchaser.

SUITABILITY FOR INTENDED USE

CodeLine 80E Series membrane housings are designed for continuous long-term use as housings for reverse osmosis, nano-filtration, ultra-filtration and micro-filtration membrane elements. Models are available for 300, 450, 600, 1000 & 1200 psi. Any make of eight-inch nominal diameter spiral wound element is easily accommodated.

In a high pressure system there is considerable potential for catastrophic failure, which could result in serious injury or loss of life. All decisions as to suitability for use must include full consideration of the various safety aspects involved. These include, but are not limited to:

- Process fluid compatibility (e.g. chemical and temperature consideration).
- External environmental factors (e.g. corrosive atmosphere, remote or special environment where certain material might be undesirable, etc.).
- Abnormal back pressure which might result in pressurizing permeate port above the rated pressure (alternate materials are available).
- Capability of the user to maintain vessel properly.
- Requirement for increased fire resistance in some circumstances.

Use of CodeLine 80E model pressure vessel for other than its intended application will void the warranty.

CodeLine will assist the purchaser in determining the suitability of the standard vessel for their specific operating conditions. For non-standard applications, alternate materials are available on special order. The final determination, however, including evaluation of the standard materials of construction for compatibility with the specific environment, is the responsibility of the purchaser.

ELASTICITY AND MOUNTING REQUIREMENTS

Mounting design must allow for vessel expansion, both axially and radially. Although the expansion under pressure is slight, undue restriction can result in damage to the vessel and to other system components. Typically a eight-element vessel, to example, would expand approximately 0.20 inch (5.08 mm) in length and 0.015 inch (0.4 mm) in diameter. The following suggestions will help to ensure the vessel is allowed to expand and will ease servicing.

1. Mount the vessel on the urethane support pads furnished. Do not mount directly to any rigid structure.
2. Use the stainless steel straps furnished. Straps should be tightened sufficiently to hold the vessel on the urethane support pads, but not so tightly so as to restrict expansion. (A torque of 25-50 lbs-in. is sufficient.)
3. U-bolts should not be used for vessel mounting under any circumstances.
4. Provide flexible piping connection to permit de-coupling the header from the vessel. The recommended Permeate Port connection is a U-bend pipe with flexible connections at each end, or a flexible hose. Recommended Feed and Concentrate connections are via flexible IPS grooved coupling.

5. Do not hard plumb any piping connections to the vessel.
6. Support the header independently. Piping should be self-supporting or supported by the headers.
7. Include an expansion loop in the branch connection to allow for:
   A. Elastic growth under pressure.
   B. Thermal growth in vessel length.
8. The total weight of branch connection and fittings supported by the vessel should not exceed 8 lbs for either the Feed / Concentrate ports or the Permeate port for CodeLine 80E model vessels.

The above suggestions are intended to help prevent damage in typical applications. Unusual or special applications may involve other considerations to be determined by the system designer.

CORROSION

Considerations relating to corrosion are an important factor in vessel application. Corrosion can result in catastrophic failure and / or cause difficulty in removing head components from the shell. Correct component material selection is essential for safe long-term use. Although the process fluid is the main consideration, external environment conditions should also be taken into account.

All reasonable precautions should be taken to protect head assemblies from external wetting, particularly in corrosive atmospheres (e.g. salt-water areas or acid atmosphere such as near lead acid battery arrays, etc.) Leaks from vessel or nearby components, which allow head parts to be routinely wetted, should not be tolerated.

The following typical list of CodeLine model 80E pressure vessel components indicating the standard material of construction of each part is listed from page nos. 7 – 10. An evaluation of the possibility of corrosion damage to the metal head interlock components is of critical importance. Alternate materials are available upon requests.

SAFETY

CAUTION

Pressure vessel may cause loss of life, severe bodily harm or property damage if not correctly installed, operated, and maintained.

Safety in service of fiberglass vessel depends on proper application, installation, operation and maintenance. This section is intended to provide guidance towards safe system design. The safety information given in the installation and operation and maintenance section should also be studied and used appropriately in conjunction with the precautions listed below.

Design Considerations for Safety

Fluid Compatibly

The materials of construction selected must be compatible with the process fluid and with proposed preserving and cleaning fluids. Standard materials are listed on the engineering drawings. In case where the standard materials are unacceptable, suitable alternative may be available.

Pressure and Temperature design limits

Operation of a vessel outside its design limits will void the warranty and would result in vessel fatigue with possible eventual catastrophic failure. Although each CodeLine 80E model vessel is tested as per ASME/CE specifications, long term operation above the designed pressure must be prevented. For permeate port pressure rating and maximum operating temperature, refer respective sales drawings.

SAFETY

Over pressure protection

It is essential that over pressure protection be provided such that the pressure to which any vessel is subjected cannot exceed 105% of design pressure.

Mounting

The pressure vessel should not be used as a support. Piping manifolds and other fittings should be supported by properly designed system framework. Operating personnel should be discouraged from applying from undue force to any fittings connected directly to a pressure vessel.

Accessibility

Pressure vessel should be positioned within the system such that elements can be inserted at the upstream end and removed from the downstream end (i.e. elements are installed and removed in the direction of feed flow).

NOTE

AFTER END OF SERVICE LIFE OF VESSEL, DISPOSE THE VESSEL AND ITS COMPONENTS AS PER APPLICABLE LOCAL LAWS AND REGULATIONS

SECTION 4 - APPENDIX

WARRANTY TERMS & CONDITION
FOR LATEST WARRANTY TERMS & CONDITIONS VISIT ON https://codeline.pentair.com/en/downloads (**Document Name -** Warranty Terms & Conditions - Pentair Warranty FRP Housings)

PENTAIR
REGISTRATION CARD

Vessel Model:	Serial Numbers Numbers are located at one end of the vessel. (If you have purchased more than 64 vessels, please attach the serial nos. separately).
Date of Purchase	
OEM Purchased From: (Name/ Address/Tel no.) _____ _____ _____ _____	_____ _____
Treatment System wherein used: (Please circle the relevant) • RO • UF • NF • Other	
System Capacity:_____GPD No. of Vessels: _____ Date of Installation:_____	
Name/Address/Tel & email of your Company: _____ _____ _____ _____	
Installation Site: (Address/Country) _____ _____ _____ _____	Mailing Address: CodeLine Division Pentair Water India Pvt. Ltd. L/52-55, Verna Industrial AreaVerna, Goa – 403 722. INDIA Tel: 91-832-6754400 Fax: 91-832-6754412 www.codeline.com

Thank you for purchasing a world class CodeLine vessel. To help us service you better and update you on “improvement and changes”, please fill up the above registration card and mail at the address given in the same.