

CODELINE® - ECOLINE 40L30 4 INCH END ENTRY MEMBRANE HOUSING FOR COMMERCIAL APPLICATIONS

USER GUIDE

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DANGER – HIGH PRESSURE DEVICE

This vessel may cause loss of life, severe bodily harm, or property damage if not correctly installed, operated and maintained. Read and understand all guidelines given in this bulleting before attempting to open, operate or service this vessel. Failure to follow these guidelines and observe every precaution will result in malfunction and could result in catastrophic failure. Misuse, incorrect assembly, or use of damaged or corroded components can result in high-velocity release of the end closure. We recommend that only a qualified technician experienced in servicing high-pressure hydraulic systems open, close and service this vessel.

Important Safety Precautions

Do's

- Read, understand and follow every guideline in this bulletin. Failure to take every precaution may void warranty and could result in catastrophic failure.
- Install in an area where a vessel or piping malfunction that result in water leakage would not damage sensitive or expensive equipment, such as electronic components.
- 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 the vessel (see Replacing Elements).

Don'ts

- Operate vessel at pressures and temperatures in excess of their specific rating.
- Service any component until you verify that pressure is 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 the spiral retaining rings is correctly installed.
- Tolerate leaks or allow end closures to be routinely wetted in any way.
- Use excessive silicone lubricant.
- Pressurize vessel without element in place unless permeate ports are plugged internally.
- Overtighten fittings in ports.
- Use petroleum products on Noryl components.
- Allow petroleum or silicone based products to come in contact with membrane elements during installation or maintenance.
- Use the vessel at negative pressure.
- Stand or climb on the pressure vessels, or the feed / concentrate or permeate ports.

General Information

The 40L30 Series of RO Pressure Vessel Housings are designed to be used in water desalination systems at operating pressures of up to 300 psi. Each model is available in lengths to house from one to three 40-inch long elements and one of each 14-inch and 21-inch long elements. Any make of 4-inch nominal diameter spiral wound element with a 3/4" diameter male product water tube is easily accommodated. The 40L30 is designed and built in accordance with the International Standards. Please refer the G.A. drawing for the hydrotesting pressure. The vessels utilize a fiberglass reinforced plastic shell for superior corrosion resistance. The information and guidelines incorporated in this User's Guide are intended only as a supplement to good industrial practice. Full responsibility for correct operation and maintenance of vessel remains with the user. This guide should be used in conjunction with drawing number 99199. When properly installed and maintained, 40L30 vessels can be expected to provide safe operation over a long service life.

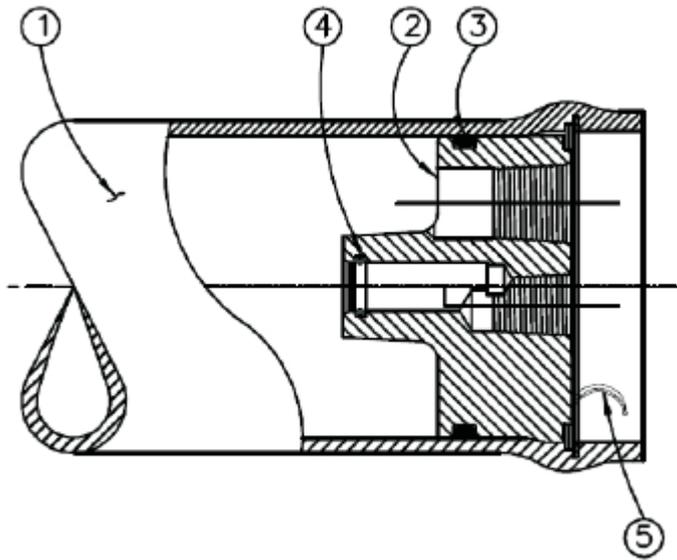
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Installation

Regardless of when or 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 connections to port fittings.
- Not used in any way to support other components such as piping, manifolds hanging from ports.

Section through end closure



Dwg Ref	Qty Per	Item #	Description	Materials
Shell				
1	1		Shell	Filament Wound epoxy/ glass composite. Head locking grooves internally wound in place.
Head				
2	2	96288	End Plug	Engineering Thermoplastic
3	2	45317	Head Seal	Ethylene polypropylene O-ring
4	2	45296	PWT Seal	Ethylene polypropylene O-ring
Head Interlock				
5	2	46414	Retaining Ring	302 Stainless Steel
Vessel Support				
6*	2	45058	Saddle-Optional	Engineering Thermoplastic
7*	2	47459	Strap- Optional	304 Stainless Steel - PVC Cushion

* Not shown in above cross section view

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Opening the Vessel

WARNING: Relieve pressure from vessel before beginning this procedure.

Contamination Removal

Metal oxidation products and mineral deposits can interfere with vessel disassembly. Remove all foreign matter from both ends of vessel as follows:

1. Remove contaminants using a small wire brush or suitable abrasive (such as medium-grade ScotchBrite™).
2. Flush away loosened deposits with clean water.



Cleaning inside the vessel

Removing the Head

The head assembly is shown in Figure 1.

Remove head as follows:

1. Disconnect permeate and the feed/concentrate piping as required at nearest convenient joint, being careful not to place undue stress on the threaded connections in the plastic permeate port and the feed/concentrate Port.

CAUTION: DO NOT tap on fittings as this could damage the ports.

Remove the Retaining Ring from the groove.

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



Lifting end of retaining ring out of groove

2. Remove the 4" retaining ring from the groove in the shell by rotating your finger behind the ring as it continues to exit the groove.



Removal of retaining ring

3. Once the retaining ring has been removed, examine the area for burrs or dings which could damage the head or membrane. If necessary, use ScotchBrite™ or 600 grade sandpaper to smooth the area.

CODELINE®**Removing Head Assembly**

1. Using a mallet, tap the head assembly lightly. Do not use a metal component to tap the head assembly.
2. Thread a ½" O.D. Engineering Thermoplastic pipe approximately 1 feet long into the permeate port.
3. Carefully rock the head assembly back and forth to release the seal (care should be taken to avoid too much stress on the product port threads).
4. Once the Plug seal is broken, pull straight outward to remove the head assembly from the vessel.
5. Remove and discard plug seal, taking care not to scratch or otherwise damage the sealing surfaces.



Removal of head assembly

6. Repeat same procedure for opposite end of the vessel.
7. As soon as possible after removal, disassemble and check all head components, as described in *Rebuilding the Head and Refurbishing Parts*.

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Replacing Elements

The following procedures are provided for information only. Elements should be installed in accordance with the element manufacturer's recommendations. Where conflicts exist, contact the element manufacturer or Pentair Water for clarification.

To replace elements, proceed as follows:

Removing Elements

Remove heads from both ends of vessels as described in *Opening the Vessel*.

NOTE: Always remove and install element in the direction of feed flow. The feed end (upstream end) is the end plumbed most directly to the pump.

1. Push element(s) out of vessel from the upstream end.
2. For multi-element vessels, remove the interconnectors and retain for reinstallation.

Inserting Elements

1. Ensure that heads are available in clean, as-new condition before proceeding. (If in doubt as to head condition see section on inspecting parts).
2. Check that all required elements are ready for assembly, with no dings or other damage which could scratch the inside of the vessel.
3. Check that the interior of the vessel is clean and free of burrs, sharp edges or other damage. Remove any residual lubricant from the vessel bore and work a fresh, thin film of Parker-Super-O-Lube™ silicon lubricant into the shell area behind the retaining ring groove and approx. ½" into the vessel I.D..
3. Orient end plug port into desired position and push plug fully into vessel. A sharp, forceful thrust may be needed to enter plug seal into the vessel bore.



Installation of the End Plug Assembly into the vessel

4. Carefully insert retaining ring into its groove. This is done by inserting the lead end of the spiral retaining ring (end without bent tab) into the retaining ring groove located in the shell, and slowly pushing the remaining turns into the shell.



Inserting Retaining Ring into the groove

CAUTION: When lubricating the vessel chamfer, wear protective gloves or finger cots to prevent cuts or penetration of fiberglass.

5. Check that the spiral retaining ring is fully seated in the groove. If it is not, remove and check for foreign material that is causing the spiral ring not to sit into the groove.



Retaining ring seated in the groove

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Lubricate element seals sparingly with the element manufacturers recommended lubricant or with glycerine.

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 the membranes.

6. Insert each element with the brine seal (typically a U-cup seat) installed on the upstream end with its lip facing upstream.

CAUTION: System malfunctions and element damage may result if elements are installed in the wrong direction.

7. Install the interconnectors between multiple elements as each succeeding element is installed.

NOTE: On some systems it may be easier to install the piping connections before the head is installed. If so, please proceed with steps 10 & 11.

8. Push each element downstream into the shell as it is installed until the element is fully engaged with the downstream head. If the elements are hard to push, make sure the brine seal is properly installed and you are pushing from the upstream end. When all the elements are fully inserted into the vessel, install the upstream head with adapter fitted if required as described in paragraphs 4 through 6.
9. Reconnect piping to vessel as described in Remaking Pipe Connection to Eng Plug.
10. Pressurize the vessel. Inspect for leaks at connections to the vessel and all around the vessel itself. If any leaks occur, release pressure from the vessel and tighten the fittings as necessary. Then pressurize vessel and check for leaks again.

CAUTION: DO NOT tolerate any leaks. Leaks can result in corrosion and eventual catastrophic vessel failure.

CODELINE®**Head Disassembly**

NOTE: Head Rebuilding should be performed in a clean work area. Dust or dirt on O-rings or other parts can scratch inner surfaces, with subsequent leakage.

1. Using a small screwdriver or similar tool remove the Plug Seal. However do not damage the sealing surface in any way as it may lead to leakage.



Removal of the Plug Seal

2. Using a small screwdriver or similar tool remove the PWT Seal from the groove in the end plug.



Removal
of the PWT Seal

Removal



Head component identification (40L30) Head disassembled

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Head Assembly

1. Use only head components in as-new condition. Use new O-rings each time the head is assembled.
2. Cover O-rings with a thin even layer of Parker Super O-Lube™ silicon lubricant or the lubricant recommended by your element supplier.



Lubricating plug seals and O-rings

NOTE: Glycerine is a commercially available lubricant that will not foul elements. However, silicon lubricant is recommended for this application.

3. Assemble the PWT Seal into the groove in the End Plug.



Installing PWT Seal

4. Insert the Head Seal O-ring into the groove on the outside diameter of the End Plug.



Inserting head seal

5. Protect heads from contamination until ready to assemble into the vessel(s).

Refurbishing Parts

Plastic parts: examine for cracking, softening or discoloring. This may indicate chemical attack of the material. Defective parts must be replaced. Alternate material may be required. Contact your supplier or Pentair Water (CodeLine™) for assistance.

Metal parts: check for corrosion, scratches, dents, cracks or other damages to shear ring and spiral retaining ring.

Carefully inspect each component for any damage that could affect structural strength or sealing properties. The following examples show some of the situations in which parts should be replaced.

End Plug - cracked, softened or distorted

Retaining Ring - chipped, scratched, corroded or bent

Refurbishing Shell

1. Using a fine wire brush, remove any large deposits from Retaining Ring groove in the vessel.
2. Using a medium or finer grade of ScotchBrite™ and mild soap solution, clean the inside of the vessel at least 4 inches in from each end.
3. Use clean water to rinse away all loosened deposits and soap residue.
4. Examine inside of vessel for scratches, gouges, or other imperfections that could prevent proper sealing. If such areas exist and leaks are observed when the vessel is placed back in service, the shell may need to be replaced.

Refurbishing Other Parts

1. Remove any large deposit from metal parts using a wire brush.
2. Scrub the entire surface with medium grade ScotchBrite™ until all contaminants are removed.
3. Rinse parts clean with fresh water and dry.
4. Inspect all parts for serviceability as specified above.

Remaking Pipe Connections to End Plug

1. Use a wire brush to remove all foreign matter from threads on pipe fittings.
2. Scrub the entire surface with medium grade ScotchBrite™ until all contaminants are removed.
3. Rinse parts clean with fresh water and dry.
4. Inspect all parts for serviceability as specified above.

NOTE: If the head has to be reoriented to attain suitable port positions, head will have to be removed and reinstalled as described in Head Assembly section.

Part Replacement

Replace all parts that cannot be restored to as-new condition. Replace any parts showing signs of structural damage and corrosion.

CAUTION: Use of components damaged by corrosion can result in catastrophic failure.

Seals should be replaced as necessary each time the vessel is serviced. Any parts that need to be replaced are available from your supplier from Pentair Water.