Pentair Water

CodeLine™ Pentair Water

Product Bulletin 526003 Rev. A

# CodeLine™ 40E30N Series RO Pressure Vessels —User's Guide—

## 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 bulletin 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...** read, understand, and follow every guideline in this bulletin. Failure to take every precaution may void warranty and could result in catastrophic failure.

**Do...** install in an area where a vessel or piping malfunction that results in water leakage would not damage sensitive or expensive equipment, such as electronic components.

**Do...** verify that head locking components are properly placed and secured.

**Do...** inspect end closures regularly, replace deteriorated components, and correct causes of corrosion.

**Do...** follow membrane element manufacturer's recommendations for loading elements into vessel (see *Replacing Elements*).

**Do not...** operate vessel at pressures in excess of their specific pressure rating.

**Do not...** service any component until you verify that pressure is fully relieved from the vessel.

**Do not...** Use corroded components. Use of such components may result in catastrophic failure.

**Do not...** pressurize vessel until after visually inspecting to ensure that both retaining rings are correctly installed and seated in their grooves.

**Do not...** tolerate leaks or allow end closures to be routinely wetted in any way.

**Do not...** use excessive silicone lubricant.

**Do not...** pressurize vessel without element in place unless permeate ports are plugged internally.

**Do not**... overtighten fittings in ports.

## General Information

**The 40E 30N RO/UF Pressure Vessel** is designed for continuous, long-term use as a housing for reverse osmosis and ultrafiltration elements in typical commercial water treatment systems. Models are available for 300 psi.

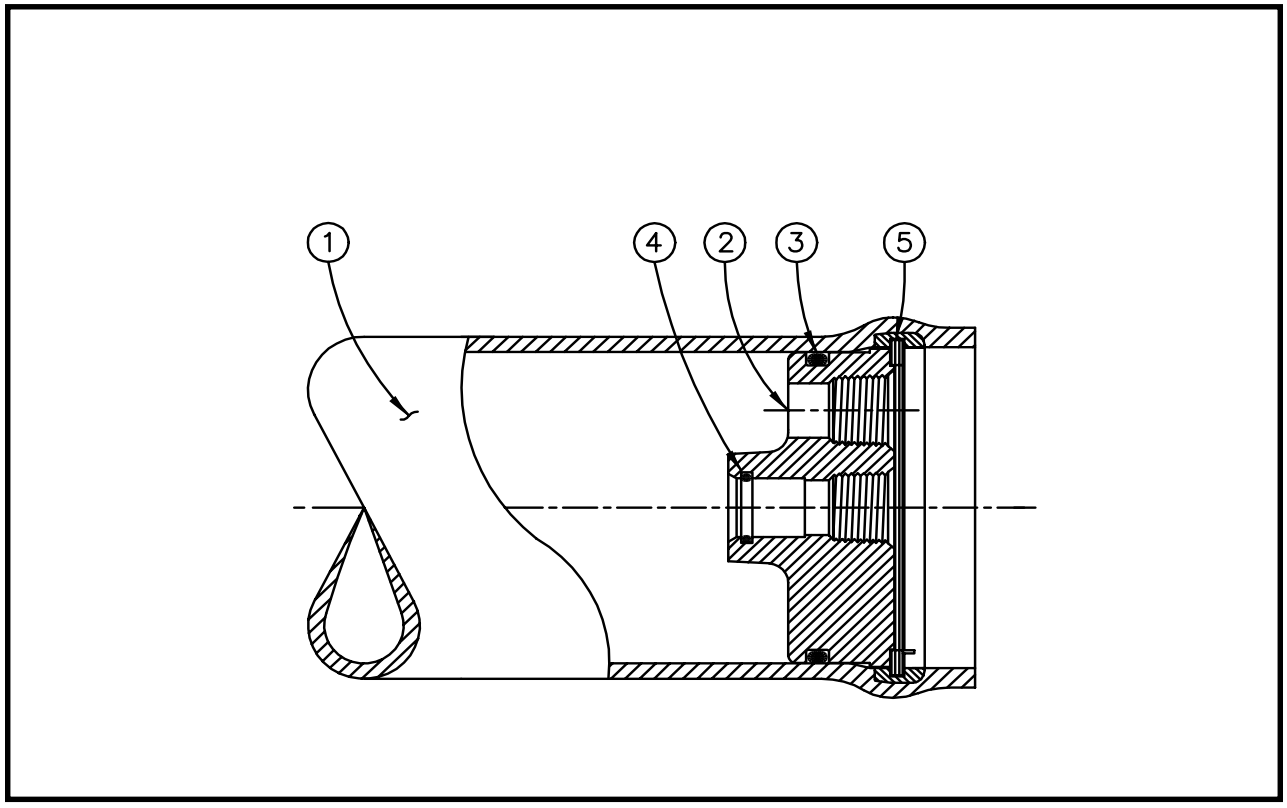
The 40E Series vessels are designed to accommodate any make of 4-inch nominal diameter 40" long spiral-wound element with a .75" diameter product water tube and a 38" long outer shell design.

The fiberglass shell can be damaged by rigid clamping, impact, scratches or abrasion. Metal parts must be maintained free of corrosion to eliminate potentially unsafe conditions due to corrosion.

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 518016 .

When properly installed and maintained, Model 40E30N vessels can be expected to provide safe operation over a long service life.




Section Through End Closure
**Figure 1A**

| Dwg Ref | Qty Per | Item # | Description | Materials |
|---|---|---|---|---|
| **Shell** | | | | |
| 1 | 1 | | Shell | Filament Wound epoxy / glass composite. Head locking grooves internally wound in place. Shell exterior coated with high gloss polyurethane paint. |
| **Head** | | | | |
| 2 | 2 | 96288 | End Plug | Engineering Thermoplastic |
| 3 | 2 | 45317 | Plug Seal | Ethylene Polypropylene - O-ring |
| 4 | 2 | 45296 | Adapter Seal | Ethylene Propylene O-ring |
| **Head Interlock** | | | | |
| 5 | 2 | 45260 | Retaining Ring | 316L SST |

# 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 (cork or rubber) 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.

# 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.

## Removing the Head

*40E30N head assembly is shown in Figure 1A.*

Remove head as follows:

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

**CAUTION**

*DO NOT tap on fittings as this could damage ports.*

2. Remove the retaining ring from the groove.

   Lift the end of the 4" retaining ring up and out of the stainless groove in the shell. This can be accomplished with a pair of pliers and a screwdriver or by using *CodeLine Removal Tool* part number 50303, available from your supplier.

   To use the removal tool, the retaining ring can be lifted upward by simply rotating the tool counterclockwise after inserting it over tab on the retaining ring. (User the smaller hole.) Hold the tool flat against the end margin and parallel to the vessel bore. It is then possible to pull the end of the retaining ring straight out. The retaining ring may snap back into the groove if this alignment is not closely adhered to.

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

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

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

5. Install a 1/2" NPT x 6" long nipple into the product port of the head on the concentrate end.

6. Grasp the nipple and pull the head straight out. A small amount of side-to-side movement may be necessary to start the bearing/sealing plate moving. Care should be taken to avoid placing too much stress on the product port threads.

7. Pull the opposite head out of the vessel.

# 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 CodeLine™ for clarification. To replace elements, proceed as follows.

## Removing Elements

1. 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.*

2. Push element out of vessel from the upstream end.

## Inserting Elements

1. Ensure that element exterior and shell bore are in clean, as-new condition before proceeding. (See *Refurbishing Shell*, Page 6)

2. Reinstall head assembly at the downstream end as described in *Closing the Vessel.*

3. Lubricate element seal sparingly with the manufacturer's recommended lubricant or with glycerine (a commercially available lubricant that will not foul elements).

**CAUTION**

*DO NOT lubricate element seals with a silicone-based material (such as Parker Super O-Lube™, the recommended lubricant for head seals).*

4. Insert the element with the brine seal (typically a U-cup seal) 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.*

5. Push the element downstream into shell until the elements fully engage with the downstream head. If element is hard to push, make sure the brine seal is properly installed and you are pushing from the upstream end.

6. When the element is installed, close the vessel as described in the following section.

# Closing the Vessel

Prepare and install head assemblies as described below.

1. Refurbish or replace head components as required to ensure as-new condition. (See *Refurbishing Parts*.) The PWT O-ring should be replaced each time.

2. Cover O-rings with a thin, even layer of Parker Super O-Lube™ silicone lubricant or the lubricant recommended by your element supplier.

**Note**

*Glycerine is a commercially available lubricant that will not foul elements. However, silicone lubricant is recommended for this application.*

3. Install the smaller PWT seal into the groove inside the end of the permeate port.

4. Remove any residual lubricant.

   A. **40E30N**. Remove any residual lubricant from the head seal.

5. Install head seal.

   A. **40E30N Only**. Install the head seal on to the end plug.

**NOTE**

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

6. Insert head, that has threaded permeate port, into downstream end of vessel. Using both thumbs, apply equal pressure on opposite sides of the bearing/sealing plate to force head into vessel so that the head clears the retaining ring groove.

7. Carefully insert retaining ring into its groove. This is done by inserting the lead end of the spiral retaining ring (end without bent tab) on 40E30 into the stainless steel retaining ring groove, located in the shell, and slowly pushing the remaining turns into the shell.

8. Check that the spiral retaining ring is fully seated in groove. If it is not, remove and check for foreign materials causing the spiral ring not to fully seat.

**CAUTION**

*DO NOT pressurize vessel without element(s) properly installed.*

9. Insert element if not already installed, and place permeate cap over product water tube in upstream end of vessel. Then install upstream head using technique given in steps 6 and 7.

10. Remaking Pipe Connections to Permeate Port

    A. Use a wire brush to remove all foreign matter from threads on pipe fittings.

    B. Apply non-hardening thread sealant or Teflon™ tape to fitting and install in permeate port. Tighten fitting a maximum one quarter-turn past hand tight; the component could be damaged if fittings are overtightened.

11. To reconnect the feed/concentrate port, follow steps A & B above, being careful to hold the bearing/sealing plate securely to prevent damage.

12. Pressurize vessel. Inspect for leaks at connections to the vessel and all around the vessel itself. If any leaks occur, release pressure from vessel and tighten 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*

# Refurbishing Parts

## Inspecting Parts

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

**Metal parts:** check for corrosion, scratches, dents, cracks or other damage to insert ring and spiral retaining ring.

**Other parts:** examine for any damage, such as gouges, chips or cracks, that could affect structural strength or sealing characteristics. The following are some examples of defects that may require replacement of the affected part.

- Bearing/Sealing Plate and Permeate Port: cracked, discolored, sealing areas damaged (chipped or gouged), port threads stripped or cross-threaded.
- Spiral Retaining rings: are the sole means of end plug retention. Parts bent, corroded, cracked or damaged in any way must not be used. Carefully check for hairline cracks.

## Refurbishing Shell

1. Using a fine wire brush, remove any large deposits from locking ring groove in the shell.
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. Take care not to damage feed/concentrate port and its respective seal.
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 deposits 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.

## Part Replacement

Replace all parts that cannot be restored to as-new condition.
Replace any parts showing signs of structural damage or 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 or from CodeLine™.