# CODELINE® - ECOLINE 25-300

## 2.5 INCH END ENTRY MEMBRANE HOUSING FOR COMMERCIAL APPLICATIONS

USER GUIDE

ARTICLE CODE: 98600

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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 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's**

- Read, understand and follow every guideline in this bulleting. 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**

- 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 ring 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 25-300 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 40-inch long elements and one of each 14-inch and 21-inch long elements. Any make of 2.5-inch nominal diameter spiralwound element with a 1/4"diameter female product water tube is easily accommodated. The 25-300 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 99359. When properly installed and maintained, 25-300 vessels can be expected to provide safe operation over a long service life.

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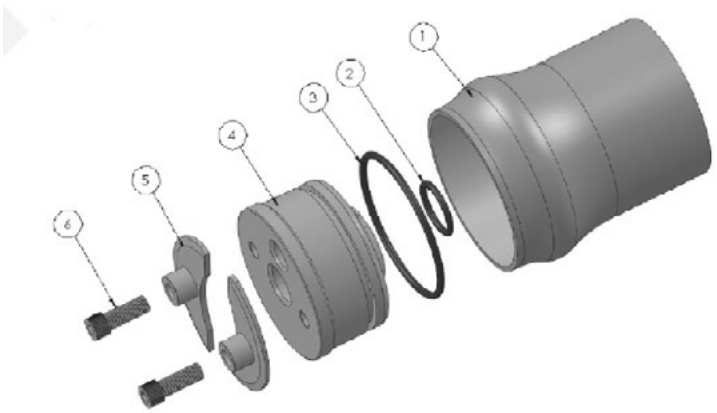
## Installation

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.




| Dwg Ref | Qty Per | Item # | Description | Materials |
|---|---|---|---|---|
| **Shell** | | | | |
| 1 | 1 | | Shell | Filament Wound epoxy/glass internally wound in place. composite. Head locking grooves |
| **Head** | | | | |
| 2 | 2 | 45296 | PWT Seal | Ethylene polypropylene O-ring |
| 3 | 2 | 45313 | Head Seal | Ethylene polypropylene O-ring |
| 4 | 2 | 96005 | End plug | Engineering Thermoplastic |
| **Head Interlock** | | | | |
| 5 | 4 | 50371 | Locking Segment | 316 Stainless Steel |
| 6 | 4 | 45232 | Screw | 304 Stainless Steel |
| **Vessel Support** | | | | |
| 7* | AR | 45058 | Saddle-Optional | Engineering Thermoplastic |
| 8* | AR | RO 1057 | Strap- Optional | 304 Stainless Steel - PVC Cushion |

* Not shown in above cross section view.

## 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

The head assembly is shown in Engg Drwg

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 end plug.

**WARNING:** DO NOT tap on fittings as this could damage ports

2. Using an align key, unscrew the screw. Once the screws are loose they can be easily removed by hand. After the screws are removed holding the the retainer remove the locking segments out of the locking groove in the vessel.
3. If the locking segment is difficult to remove try soaking with a release agent such as LPSTM or WD40TM, being careful to avoid any contamination of a membrane element.
4. Once the locking segment is 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.
5. Engage a 1/4” male NPT pipe in the permeate port and pull the head assembly straight out. It may be necessary to give a sharp forceful tug to the head from side to side in order to start the head moving. Take care to avoid damaging the permeate port. It is made of PVC or other engineering thermoplastic (occasionally stainless steel or other metal) and is not designed to withstand mistreatment.
6. Remove and discard plug seal, taking care not to scratch or otherwise damage the sealing surfaces.
7. Repeat above procedures for opposite end of vessel.

## Replacing Elements

The following procedures are provided for information only. Elements should be installed in accordance with the element manufacturer1s 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(s) out of vessel from the upstream end.
3. For multi-element element vessels, remove the interconnectors and retain for reinstallation

## Inserting Elements

1. Ensure that element exterior and shell bore are in clean, as-new condition before proceeding (See Refurbishing Shell)
2. Reinstall head assembly at the downstream end as described in Closing the Vessel, with adapter fitted (if required)
3. Lubricate element seals sparingly with the manufacturers 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 arrer Super O lubeTM the recommended lubricant for end plug seals)

4. Insert each 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 each element downstream into shell as it is installed until elements fully engage with the downstream head. If elements are hard to push, make sure the brine seal is properly installed and you are pushing from the upstream end.
6. When all elements are 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 arts ) O-rings should be replaced each time
2. Cover O-rings with a thin, even layer of Parker Super O-LubeTM silicone lubricant or the lubricant recommended by your supplier.

**NOTE:** Glycerine is a commercially available lubricant that will not foul elements oweeer silicone lubricant is recom mended for this application

3. Remove any residual lubricant from the vessel bore and work a fresh, thin film of Parker Super O-LubeTM silicone lubricant into the lead-in chamfer and an area approximately 1 inch in width from the chamfer.

**CAUTION:** When lubricating vessel chamfer wear protective gloves or finger cots to prevent cuts or penetration by fiberglass

4. Install small O-ring groove inside small end of plastic end plug.
5. Install large O-ring(s) in external groove(s) of end plug.
6. Install adapters, if required, into end plugs. Insert one end plug into downstream end of vessel. Using both thumbs, apply equal pressure on opposite sides of end plug to force plug into vessel so that head locking segment groove is exposed.
7. Carefully insert locking segments into its groove. Align the hole of locking segment & end plug. After both the holes are aligned properly, screw the bolt through the locking segment in the end plug.
8. Check that locking segment are fully seated in groove.

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

9. Insert elements, then install upstream head, (with adapter if required).
10. Reconnect piping to vessel, as described in Refur bishing arts.
11. If threading fittings into end plug, avoid over tightening. Hand tight plus approximately 1/4 turn should produce a satisfactory seal. If leaks occur on pressurization, a small amount of further tightening may be required.
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

## 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 for assistance.

**Metal parts:** check for corrosion, scratches, dents & cracks

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 or vessel should be replaced.

**Vessel Locking Ring Groove**- damaged (chipped or Gouged)

**End Plug** - cracked, discolored, sealing areas damaged (chipped or gouged), port threads stripped.

**Locking Segment** - sole means of end plug retention. Parts bent, corroded, cracked or dam aged 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 vessel.
2. Using a medium or finer grade of ScotchBrite™ and mild soap solution, clean the inside of the vessel at least 2 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 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.

## Remaking Pipe Connections to End Plug

1. Use a wire brush to remove all foreign matter from threads on pipe fittings.
2. Apply non-hardening thread sealant or TeflonTM tape to fittings and install into end plug. Tighten each fitting a maximum one quarter turn past hand tight; the plastic end plug could be damaged if fittings are over tightened.
3. Fit end plug and **locking segment** as described in Closing the Vessel.

## 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 re- placed are available from your supplier or from CodeLine.