Technical Service Bulletin

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HYDRAcap® Element Installation Instructions

This Technical Service Bulletin provides information required to install HYDRAcap® Ultrafiltration elements and to demonstrate a sample support rack assembly.

Material, tools and equipment requirements

- Glycerin
- Pure silicone lubricant (Molykote 111 or Parker Super O-Lube)
- Permeate or fresh water
- PVC pipe or rope – length depends on the length of pressure vessels
- Sponge ball or 6” or 8” PVC Cap (to be fixed at one end of PVC pipe or rope)
- Towel or cotton rag
- Spacing rings
- Brush or dauber for lubrication of brine seals
- Tools and parts as per pressure vessel manufacturer recommendations for removing and installing of end cap assembly
- Personal protection equipment (gloves, glasses, shoes, hard hat)

Note: When loading elements into a system, **do NOT use oil, grease, or petroleum based compounds** to lubricate o-rings and brine seals as these may cause damage to membrane or other components of the element. Use only silicone based gel or a mixture of 50% glycerin in water to lubricate o-rings and brine seals.

Pressure Vessel Preparation

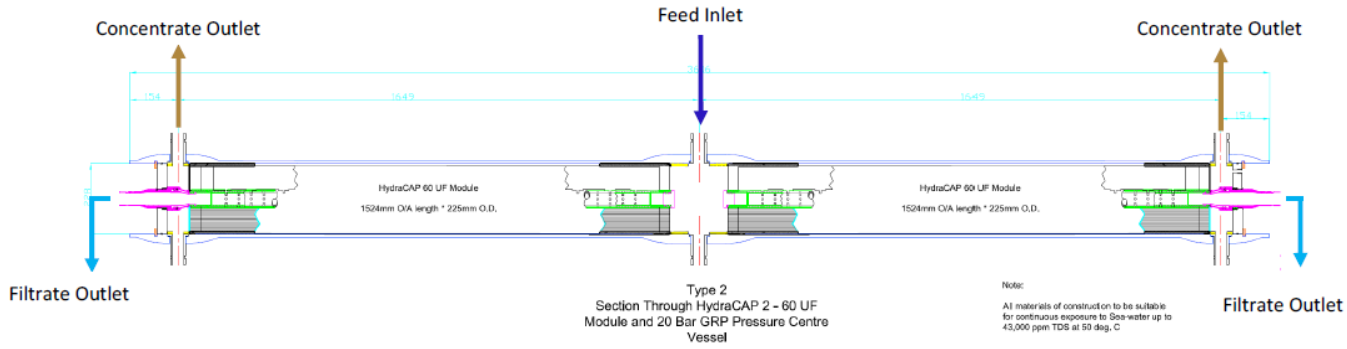

Figure 1: Twin pressure vessel setup.

1. Remove pressure vessel end caps from both sides of the vessel (**Note:** Refer to pressure vessel manufacturer's manual for removal and re-installation of end caps assembly).
2. Disassemble and wash all end cap parts (i.e. o-rings, end adapters, interconnectors, etc.) in fresh water and keep them clean for re-installation. Perform an inspection and count all parts prior to reassembling to ensure integrity and inventory.
3. Clean the inside of the vessels to remove any dust and debris that could mechanically damage the membrane surface. Hosing down the insides of the pressure vessels with water usually **will not** be sufficient to clean the vessels.
4. Lubricate the inside of the pressure vessel with a 50 – 75% solution of glycerin and water. This will help with the ease of loading the vessels. There are multiple techniques that can be considered:
    - Use a sponge ball wrapped in a towel or cotton rag and soaked in glycerin solution. The sponge ball can be pushed/pulled through the vessel with a piece of rope or long PVC pipe. Alternatively, the sponge ball can be pushed through the length of the vessel with a piece of PVC pipe with a PVC flange attached to the end.
    - Another method is to use a 6 – 8" PVC cap covered in rags (should fit snuggly into the pressure vessel) attached to a rope slightly longer than the length of the vessel. Pull the PVC cap covered in rags and soaked in glycerin through the vessel with the rope.

      Caution: Be sure to avoid scraping the pipe along the vessel surface. Also, take care to push the end cap in squarely to avoid rolling the head seal.

Note: A 65/30/5% Glycerin/Water/SBS (sodium metabisulfite) solution can be used to help disinfect the vessels. Also, a 15:1 mixture of water and SBS (add about 1 cup of SBS powder to 1 gallon water) can be made to swab the vessels before the glycerin for disinfection, if necessary.

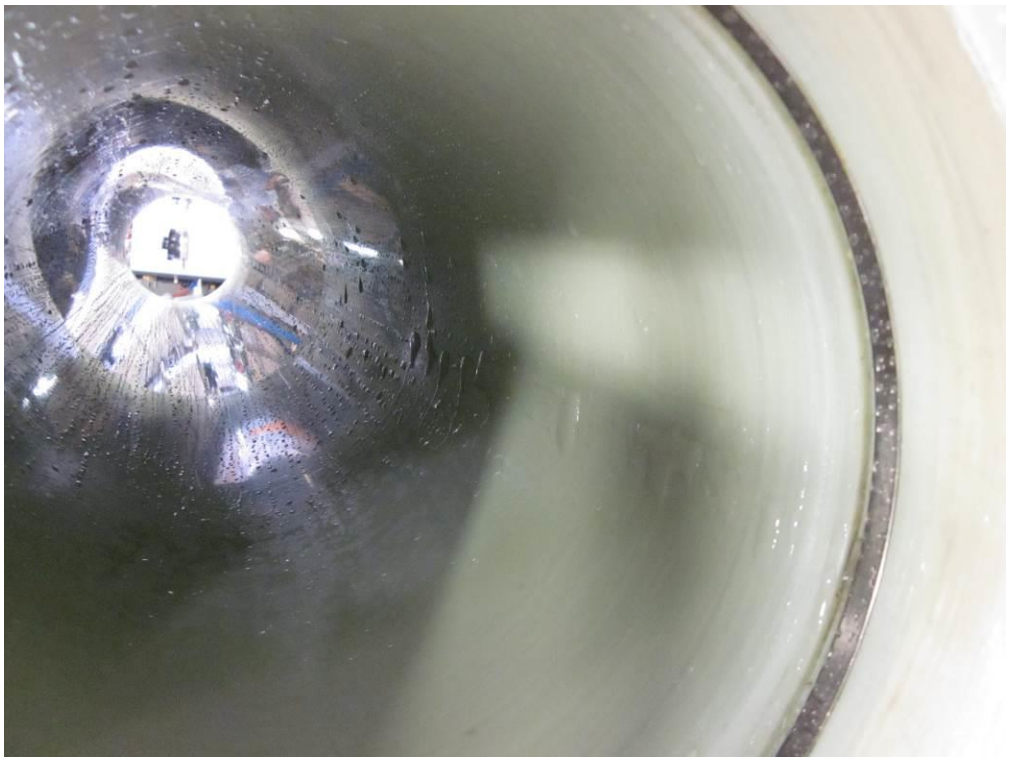

Figure 2: Glycerin lined pressure vessel.

Installation Procedure (HYDRAcap Elements)

The HYDRAcap® elements are shipped from the factory with a preservative solution in a vacuum sealed bag. The elements can be installed and removed from either end of the pressure vessel. The following is the recommended installation procedure:

1. Follow “Pressure Vessel Preparation” guidelines and ensure to clean the system and it’s piping sufficiently to prevent foreign matter from entering the modules. This allows any debris, preservatives, and solvents to be flushed out so that they do not come in contact with the elements/membranes.
2. Ensure pressure vessel caps are removed from both ends.
3. Remove first HYDRAcap® element from sealed bag.
4. Maintain a loading record of each element serial number, vessel location, and position.
5. Push first element into vessel three-quarters of the way in so that center interconnector can be inserted into element.
6. Apply a thin layer of pure silicone lubricant as necessary and insert interconnector in core tube of first element. Hold down element with other hand as necessary to prevent from sliding into the pressure vessel.

7. Remove second HYDRAcap element from sealed bag and push element onto the central interconnector before pushing the two connected elements to the end of the pressure vessel. Ensure second module does not rest on interconnector by supporting second module as necessary.

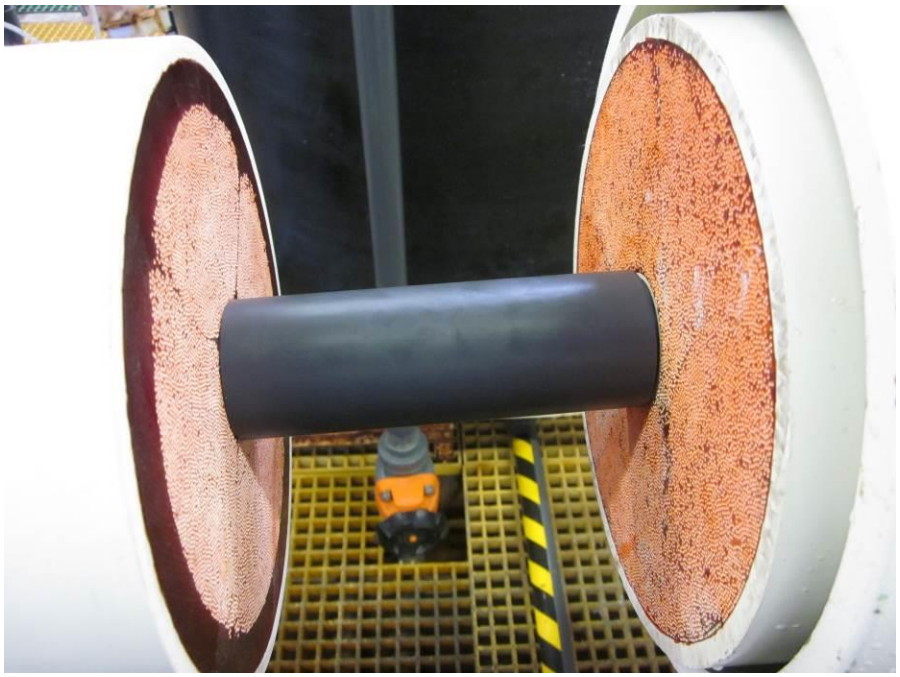

Figure 3: Two elements joined by one interconnector.

8. Fit end plate filtrate pressure vessel adapter at far end of pressure vessel and close out, ensuring that elements have been pushed fully into adapter.

   Note: It may be necessary for one operator to install end plate to close out pressure vessel, while a second operator may need to place his hand in the loading end to ensure the end plate pressure vessel adaptor does not pop out from the element while banging the end plate into place.

   Caution: Watch fingers and hands for pinch points.

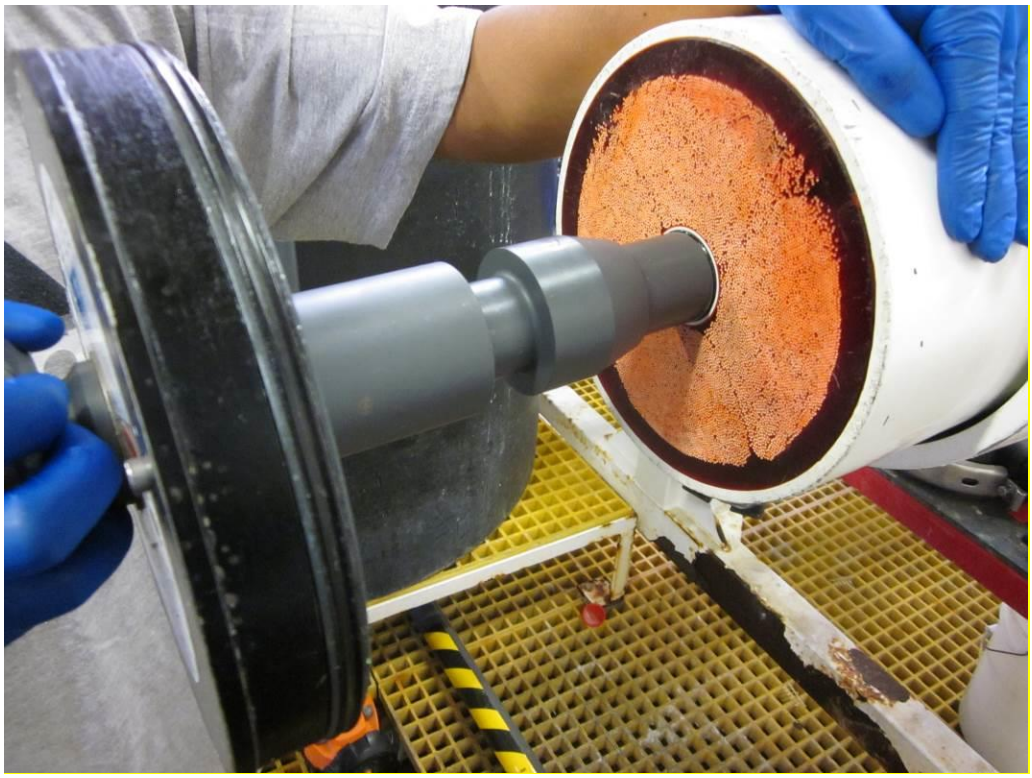

Figure 4: Install end plate adaptor and end plates.

9. Close out the loading end of the pressure vessel, inserting any spacing rings on the end plate adaptor to create a tight fit before finally closing the end plate of the pressure vessel. All pressure vessels are built with some tolerance in length. To account for small differences, spacing rings will help minimize elements from moving. Also, it may be necessary to hit the end plate with the handle of a hammer to ensure proper installation.

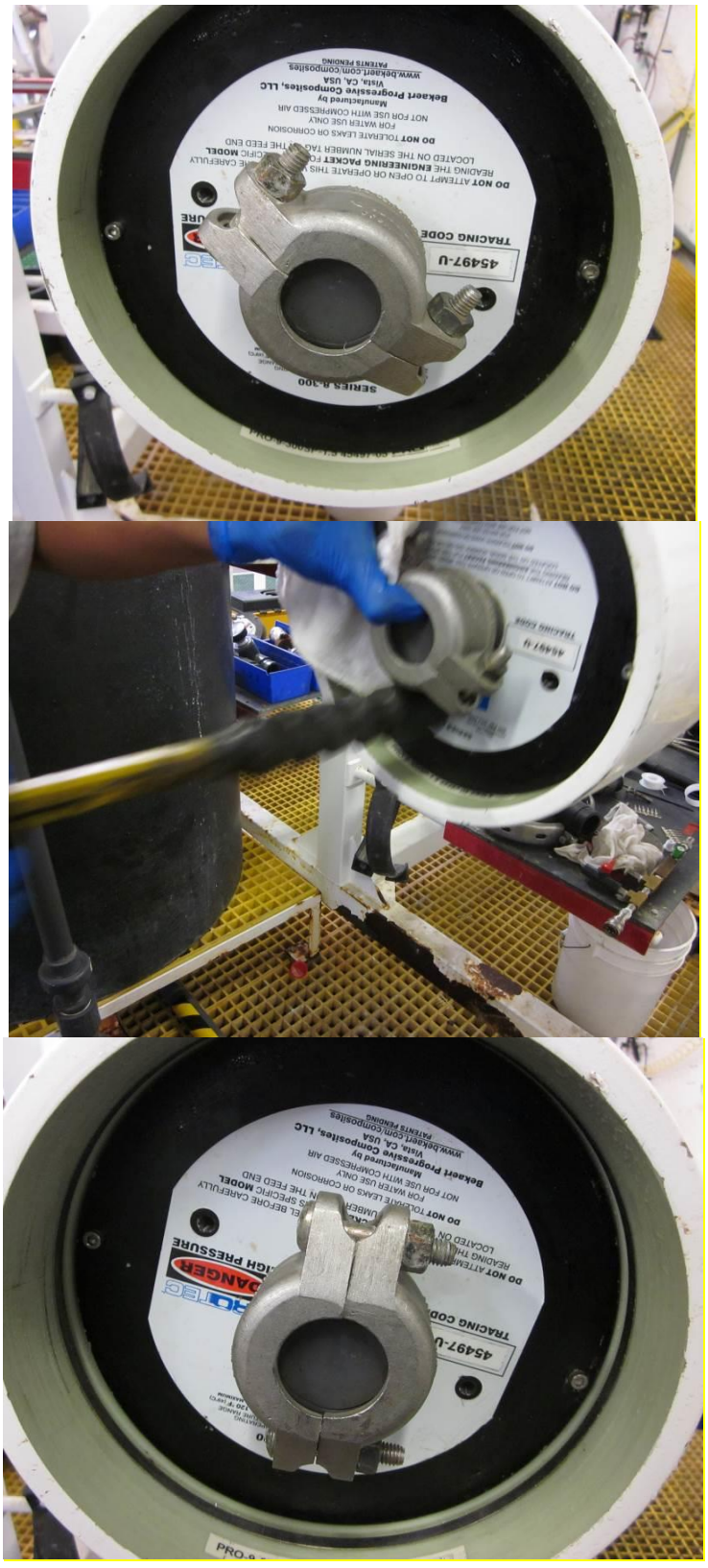

Figure 5: The end plate will need to be pushed in to allow for the locking rings to be installed. If the end plate is difficult to insert, the handle of a hammer may be used to assist as shown in the pictures above. Be careful when inserting plate to not damage any components.

10. Insert any remaining locking rings or parts for pressure vessel end plate.
11. Flush thoroughly with permeate or city water.

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