



# Shimming Elements

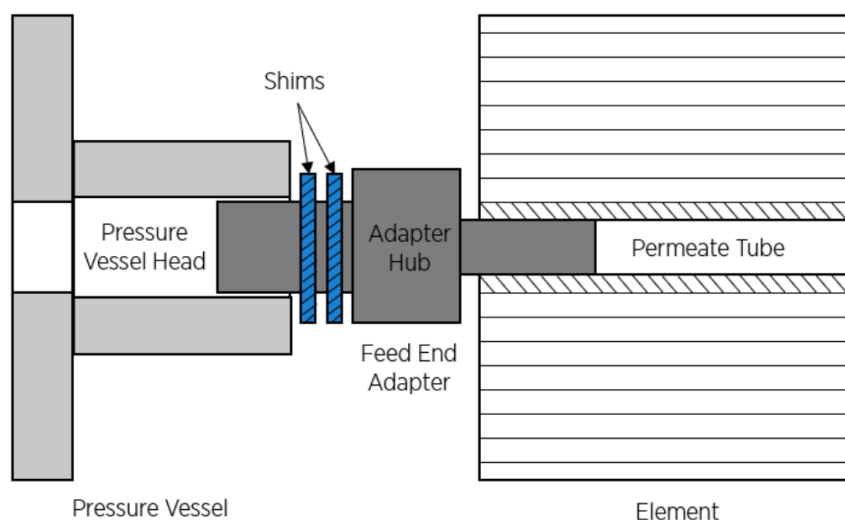
The following guidelines are intended to provide information on shimming Membrania® elements. For additional instructions, please contact DC Solutions Technical Service or the individual pressure vessel manufacturer.

## SHIMMING PROCEDURE

All pressure vessels are built with some tolerance, known as “freeboard”, to allow for slight variations in the length of elements. During operation, the pressure vessel elongates slightly when pressurized, increasing freeboard. Shimming the elements in a pressure vessel, therefore, helps prevent the elements from sliding back and forth during start-up and shutdown and ensures that the adapters are properly seated in the permeate tubes of the lead and tail elements, preventing leaks.

Shims are plastic spacer rings that look like washers. Shims are typically about 5 mm (0.20 inches) thick with an inner diameter slightly larger than the pressure vessel head end of the adapter.

**Figure 1.** shows a diagram of the placement of multiple shims on the feed end adapter between the adapter hub and the pressure vessel head.





After fully loaded, the elements should be pushed completely into the vessel such that the downstream element is firmly seated against the thrust ring at the concentrate end of the vessel. The process of shimming is then performed:

1. Remove the adapter o-ring and head seal from the feed end cap assembly.
2. Remove the adapter from the head assembly and gently lubricate the adapter seal with lubricant (see approved lubricants in **Element Loading Guide – Loading of Pressure Vessels** (TSG-O-006)).
3. Insert the adapter into the element permeate tube.
4. Remove the end cap on the adapter and slide shims over adapter. Add enough spacers so it is not possible to install the retaining rings after seating the head.
5. Remove one spacer at a time until you can just install the retaining rings. The slight remaining movement, or a gap of ~2 mm (0.08 inches) between the end plate and the shims, is acceptable and will not cause problems in performance.
6. Insert the adapter into the end cap permeate port and re-install o-rings, lubricating them gently with lubricant.
7. Install the end cap assembly. Lubricate as necessary.
8. Close the vessel.
9. Repeat steps 1 through 8 for all pressure vessels.