



#### 7-1. Opening Pressure Vessel

##### STEP 1 RELIEVE PRESSURE

1. Shut off all sources of pressure and relieve pressure from the vessel, following the system manufacturer's recommendations.

##### STEP 2 DISCONNECT PERMEATE PORT

2. Disconnect and remove permeate piping from the permeate port of the vessel.

##### STEP 3 EXAMINE END CLOSURE

3. Examine end closure of vessel for corrosion. If any is evident, proceed as follows :
  - Loosen any deposits with a small wire brush and/or a medium grade piece of Scotchbrite.
  - Flush away loosened deposits with clean water.

##### STEP 4 REMOVE INTERLOCK

4. Use a 1/4" hex key wrench to remove the three securing screws from the yellow plastic securing ring. Place one of the screws aside for use on reassembly. Thread the other two screws into the threaded jacking holes in the securing ring until they contact the bearing plate. If excessive corrosion build-up prevents threading,
  - Apply penetrating fluid (such as WD-40® or LPS-1®) to interfacing areas of securing ring. (Securing ring may have become bonded to locking ring set and/or bearing plate.)
  - With a screwdriver handle or similar tool, tap the securing ring to release the bond.
  - Again attempt to remove ring by turning the jacking screws an additional 1/4 turn.
5. Grip the two (2) screws firmly and pull the securing ring towards you. Once ring is free, carefully remove it from the bearing plate.
6. If ring cannot be freed by the method, then use the screws as jacking screws by turning 1/4 turn on each screw.
7. Once ring has started to move, repeat procedure in step 5. above.

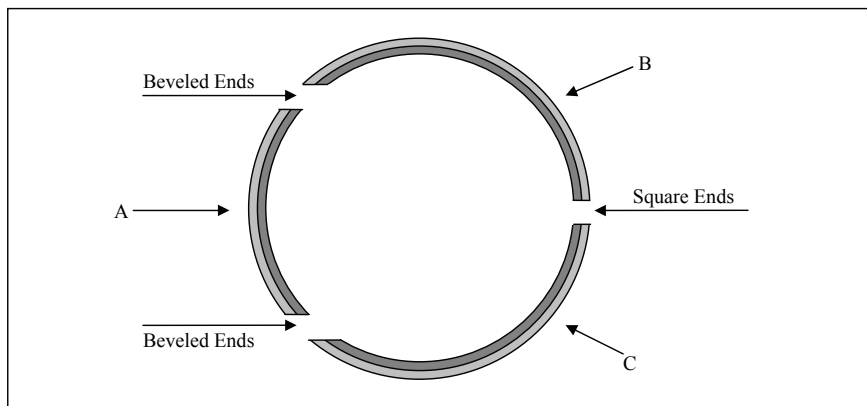


## Procedures for Replacing Elements

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8. Use a cushioned mallet or hammer in conjunction with a wood block to tap bearing plate face. This should free locking ring segments.
9. Refer to Figure. 1 for locking ring segment identification.
10. Rotate locking ring set so that segment A (key segment) is at the 12 o'clock position. Segment A can now be removed. If segments will not rotate, repeat 1A, 1B, and 5.
11. Repeat step 10 above for segments B&C.
12. After removal of segments, remove all debris (corrosion products, dirt, etc.) from the vessel ends.



**Figure 1. Locking ring set**

### **STEP 5 REMOVE HEAD**

#### **STEP 5A REMOVAL BY HAND**

13. Thread a short length (12 in.) of 1 in. I.D. pipe into the permeate port and pull the head straight out. A sharp forceful tug may be required to start the head assembly moving.
14. If the head seal remains in the vessel bore, it should be removed at this time.

#### **STEP 5B REMOVAL USING HEAD TOOL**

15. Insert the tool into the shell with threaded rods in line with bearing plate holes.
16. Thread the rods into the bearing plate holes and turn until the knobs bottom out.



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17. Grasp tool with both hands and pull straight out to remove the head. If the head will not release from the shell,

Thread a 1" ID pipe approximately 2 feet long into the permeate port.

Carefully rock the head assembly back and forth to release the seal.

Once the head seal has been broken, complete removal as instructed in the Opening Vessel section.

18. To remove the tool from the head, reinstall the head part-way into the shell so that the tool is compressed, then unscrew the rods.