Kiel II Valve Replacement

You will need the following parts to rebuild one of the stainless steel valves inside the Kiel Device oven (see valve.jpg). These instructions DO NOT cover the replacement of the gold block valves.

Valve membrane	M0000-65301
Gold stamp	M0000-65304
Gold "O" ring	M0000-54527

These valves leak when they are closed. You will notice a valve is leaking when multiple samples do not pass the leak test. When the B line shuts down, valve 176 is leaking. When the A line shuts down, valve 184 is leaking. Follow these steps:

1. Detach the vial on the side where the valve is leaking. This puts atmosphere on the back side of the valve so you can take it apart.

2. Open the valve (this closes the compressed air to the normally open valves)

3. Consider removing the Acid Reservoir (to avoid breakage)

4. Remove the upper oven shelf to get better access to the work area.

5. Remove the four allen screws from the faceplate. We use a special long 'tee' handled 5mm allen wrench which has a ball on the end so the wrench can be used at many angles (see val-tool.jpg).

6. Use your fingers to pull the square faceplate away from the round piston assembly. There is no need to disconnect the compressed air lines.

7. Rotate the piston assembly and find the air hole. We use the long tube which comes with "canned air to blow the membrane assembly apart from the valve housing.

8. Place the membrane assembly with the set of compressed spring washers face up on a counter. Use the special tool, which looks like 'needle nose pliers', to remove the guard ring which frees the valve membrane from the membrane assembly. These pliers work opposite normal ones: when you squeeze the pliers they open the ring. The ends of the pliers fit into small holes in the guard ring. It is important that you DO NOT open the ring too far as it will stretch and have to be replaced. Remember that when you remove the ring, the compressed washers below will expand upward.

9. Remove the series of curved spring washers by simply lifting the valve housing off of the valve membrane, keeping the 'spring washer' unit intact. The valve membrane assembly will be left on the counter to be disposed of.

10. Gently place the new gold stamp into the new valve membrane. Using finger pressure alone, push the gold stamp into the membrane. Place the membrane assembly into a small vise and exert equal pressure on the gold stamp and the back of the valve membrane (see val-mem.jpg). DO NOT apply pressure to the edges of the stamp but instead use firm even pressure to the middle of the stamp to avoid damaging the stamp edges.

11. Insert the membrane assembly up through the valve housing, making sure that the membrane post fits through the spring washers.

12. Using the special plier tool again, slightly open the guard ring and press down on the washers so the ring can fit into the groove of the membrane post. BE VERY careful with the attached gold stamp on the bottom. You don't want to scuff up the edges.

13. Clean out the piston assembly housing and lightly grease the outer edge of the 'O' ring inside. The valve will not work without some lubrication. Slide the piston assembly back into the housing

14. Dust off the valve block assembly and place the new gold "O" ring against the block body.

15. Place the piston assembly against the gold 'O' ring and the valve block body.

16. Place the valve faceplate with the still attached compressed air line against the valve membrane assembly, making sure that the gold 'O' ring doesn't slip. Reattach the four allen screws as you would a car tire, rotating the tightening around each screw. Tighten rather hard. The four allen screws may need to be re-tightened after the assembly has been under vacuum.

17. Seat the new gold stamp by opening/closing the valve 20-30 times and check for leaks. Raise the Kiel Device oven to 70C to remove water before running samples.

Definitions

Faceplate = Square Stainless Steel plate to which the compressed air is attached. It is attached to the valve block assembly by four allen screws

Valve Block assembly = part of valve left in oven when faceplate and piston assembly are removed

Piston assembly = membrane assembly + piston housing

Membrane assembly = valve membrane + gold stamp + spring washers + guard ring