

# Use and Assembly of the Low Volume Cap Kit

*This product information document will describe how to assemble the Low Volume Cap Kit. This special kit accompanies many of the Low Volume cells offered by Pine Research, and it allows mounting and sealing of the LowProfile working, counter, and reference electrodes, as well as purging/sparging accessories, into a Low Volume cell.*

## 1. Sealing Electrodes and Purge/Sparge Tubes in Cap Kit

The Low Volume Cell Cap Kit (Pine Research part number AF01CKT1004) is designed to tightly seal around all LowProfile electrodes (E1B series electrodes) and purge/sparge tubes. Once assembled, the cap kit seals into the top 24/12 or 24/25 joints found in most Low Volume cells offered by Pine Research.

Use of this cap kit requires a plan prior to experimentation. You must have identified the working, counter, and reference electrodes and have them prepared and ready to use. Similarly, decide whether or not you will add gas into the cell and if so, plan for a vent as well (perhaps in the headspace).

The cap kit consists of four 7 mm holes and one 3.5 mm hole. The kit includes appropriately-sized O-rings for use with matching probe diameters. Pine Research offers working and counter electrodes to fit the 7 mm holes and reference electrodes to fit the 3.5 mm hole. To take advantage of the sealing aspect of the lid, select the appropriate plug to use in any hole that does not contain a probe.

The basic principle of the cap kit is to seal all probes (*i.e.*, electrodes) into the cap by wedging a soft O-ring between the upper and lower halves of the cap and clamping the halves together to seal any gaps. Then, the assembled cap kit seals directly into the half cells. The following images will walk through the steps to position and seal the electrodes in the cap.



**Figure 1-1. With the thin aspect of the cap kit, insert a probe (a purge tube in this image) through the appropriate hole and add an O-ring.**



**Figure 1-2.** Repeat the probe and O-ring insertion for each type of electrode, plug, or glass tube. Take special caution to appropriately adjust the height of the O-ring to ensure the assembled cap will fit into the cell without the probes hitting the bottom of the cell surface.



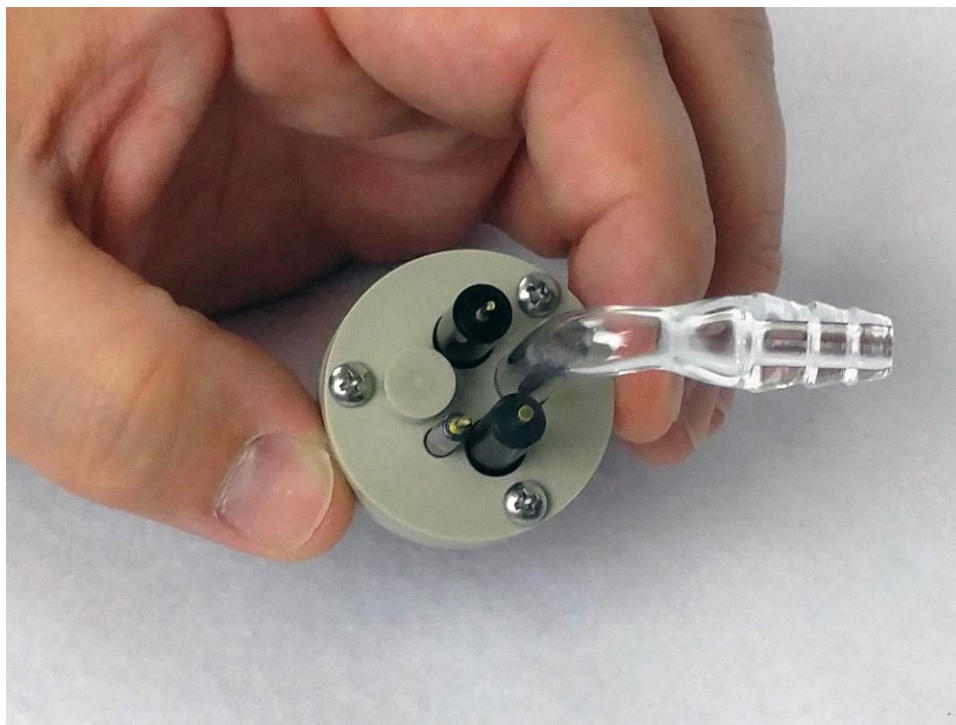
**Figure 1-3.** Invert the cap so that the probes are held in place when the O-ring hits the cap. Again, adjust height appropriately.



**Figure 1-4. Slide the larger part of the cap kit onto the probes. Note: there is a directionality and the cap will only fit on in one orientation. Shown here is the cap kit with probes and O-rings installed, just before sealing the probes into the cap.**



**Figure 1-5. Install a screw to join the two cap halves. Loosely tighten one screw at a time to appropriately balance the cap seal. Note: DO NOT YET TIGHTEN SCREWS. It is useful to insert the cap kit with electrodes into the cell at this stage, before completely tightening the three screws. This allows any displaced air in the cell from becoming pressurized as the cap kit is pressed into place.**



**Figure 1-6.** Once all three screws are loosely installed, insert the kit into a cell, then slowly tighten each in a random order, watching the side of the cap to ensure even pressure is applied.