

Porous Glass Frit Replacement Kit Information

The Porous Glass Frit Replacement Kit (Part # AKFRIT125) contains a set of three porous glass frits and short lengths of FEP heat shrink tubing for changing the frit in one of Pine Research's non-aqueous reference electrodes.

Pine Research offers several varieties of non-aqueous pseudo-reference electrode kits. Many newer versions of these reference electrode kits come with porous glass frits affixed to the borosilicate glass tubes with FEP heat shrink tubing. These include the LowProfile Ag Reference Electrode Kits (Part #s AFREF003062 and AFREF003093) and Standard Ag Reference Electrode Kit (Part # AFREF010192).

Note that previous versions of Pine Research non-aqueous reference electrode kits, both LowProfile (Part #s RREF0153 and RREF0153L2) and Standard (Part # AKREF0033) sizes, used borosilicate glass tubes with built-in ceramic frits. It is not possible to replace the ceramic frits in those earlier models, nor is it possible to install a porous glass frit from AKFRIT125 in place of those ceramic frits. In some cases, the ceramic frits were not ideal when working with certain non-aqueous electrolytes.

These porous glass frits should be applicable in nearly any aqueous or non-aqueous electrolyte, which is why the previous ceramic fritted glass tube product offerings have been replaced with porous glass frits instead. Additionally, as this document will detail, a benefit of the glass fritted reference electrodes is that the frits can be easily removed and replaced if they become blocked or partially blocked and cannot be refreshed.

**NOTE:**

Porous glass frits included with AKFRIT125 cannot be used with previous ceramic fritted reference electrodes (RREF0153, RREF0153L2, or AKREF0033). The ceramic frits on those products are built-in and cannot be removed from their glass tubes, and a porous glass frit cannot be added to a ceramic fritted glass tube.

1. Product Photographs



Figure 1. Packaging for AKFRIT125

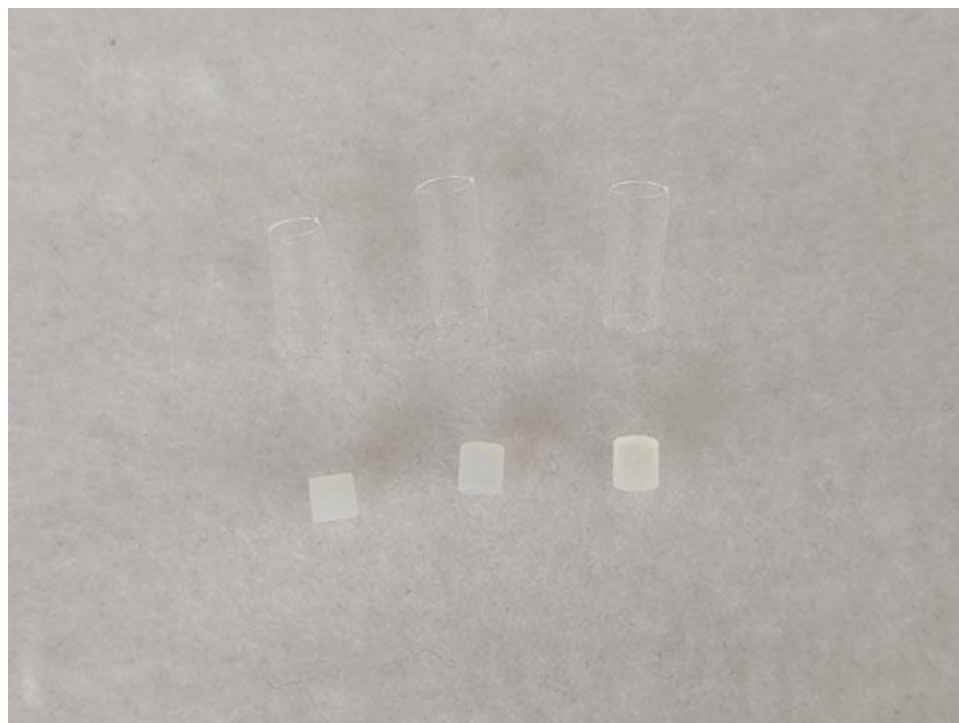


Figure 2. Contents of AKFRIT125 (3x porous glass frits, 3x short lengths of FEP heat shrink tubing)

2. Replacing Porous Glass Frits

When the porous glass frit of a non-aqueous reference electrode becomes blocked or partially blocked, it can have a severe effect on electrochemical results. Blocked frits can result in a dramatic increase in reference electrode impedance, and if the blockage cannot be cleared and the frit adequately refreshed (see reference electrode documentation for suggestions on refreshing the frit) it must be replaced. Consult the following steps for replacing the porous glass frit using the items included in AKFRIT125.

2.1 Step 1: Cut the existing heat shrink tubing

Using a thin blade, safely and carefully slice through the existing FEP heat shrink tubing on the bottom of the borosilicate glass tube.

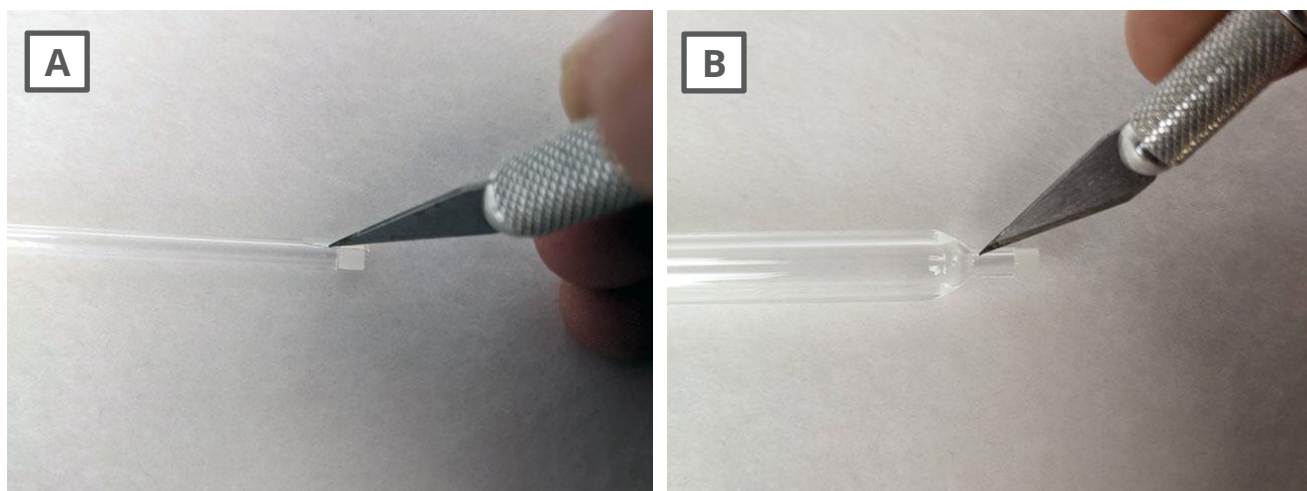


Figure 3. Step 1 of porous glass frit replacement for (A) LowProfile (AFREF003062 and AFREF003093) and (B) Standard (AFREF010192) non-aqueous reference electrodes.

2.2 Step 2: Remove existing porous glass frit

Once the FEP heat shrink tubing has been cut and is loose, carefully pull the porous glass frit and heat shrink tubing away from the borosilicate glass tube.

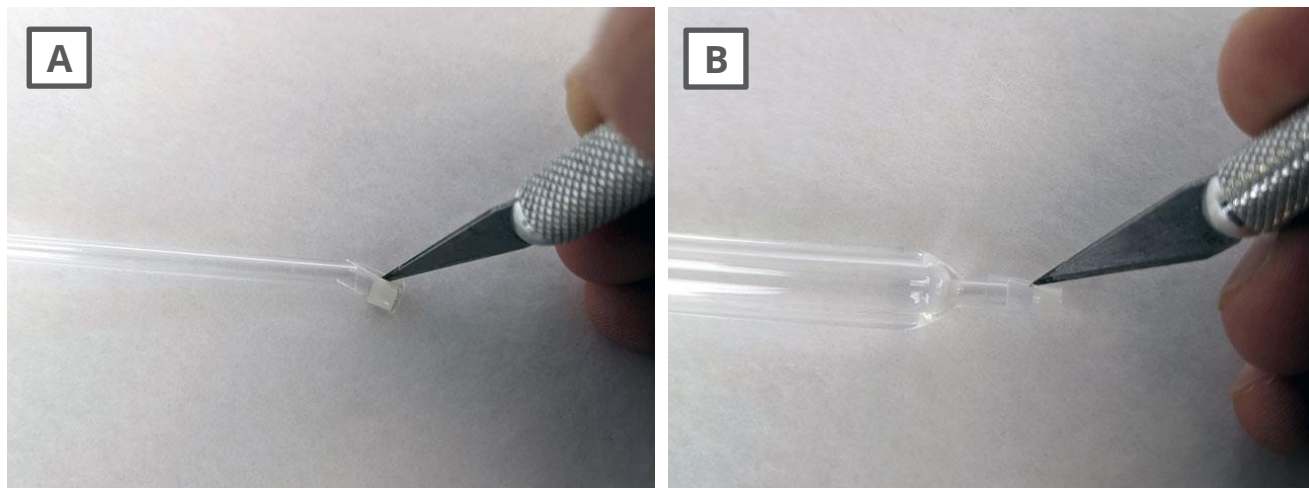


Figure 4. Step 2 of porous glass frit replacement for (A) LowProfile (AFREF003062 and AFREF003093) and (B) Standard (AFREF010192) non-aqueous reference electrodes.

2.3 Step 3: Put new porous glass frit and heat shrink tubing in place

Place a new porous glass frit onto the end of the borosilicate glass tube, and slide a piece of the FEP heat shrink tubing around the frit. Note: for the standard size glass tube (AFREF010192) the heat shrink tubing will rest conveniently on the portion of glass tube where the diameter increases. For the LowProfile glass tube (AFREF003062 and AFREF003093), it may be necessary to slightly tilt the glass tube so the heat shrink tubing does not slide too far down.

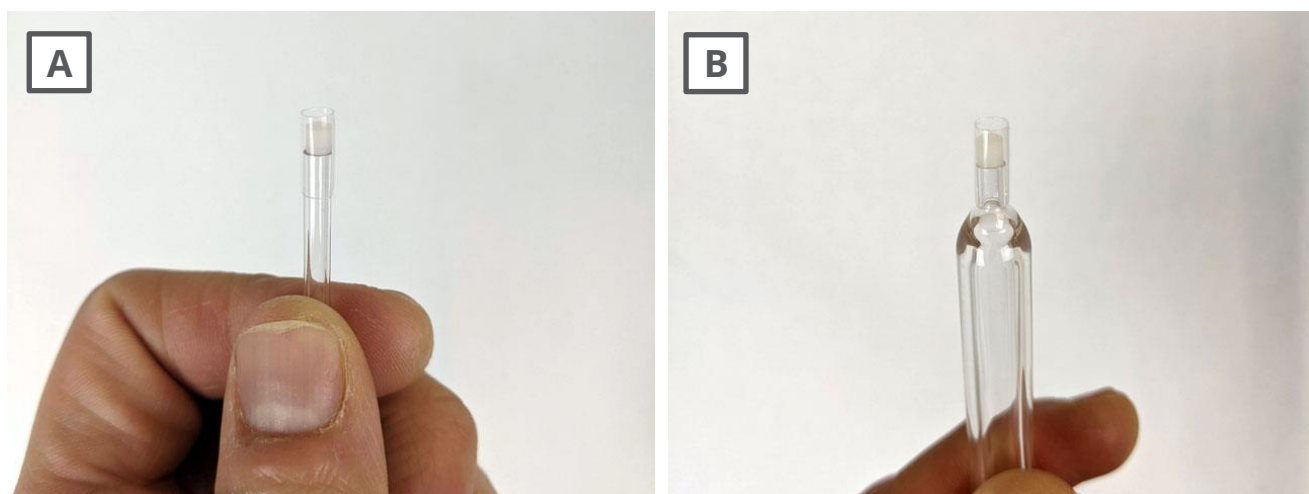


Figure 5. Step 3 of porous glass frit replacement for (A) LowProfile (AFREF003062 and AFREF003093) and (B) Standard (AFREF010192) non-aqueous reference electrodes.

2.4 Step 4: Apply heat to seal the frit in place

Using a heat gun or other direct heat source, lightly apply heat evenly to the FEP heat shrink tubing and porous glass frit while slowly rotating and moving the glass tube. The shrinking temperature required for FEP is 180°C. Be cautious to not apply too high a level of heat, as this can cause the porous glass frit to become discolored. A very slight manual tug of the heat shrink tubing and frit, once cooled, can be applied to test that it is firmly affixed onto the glass tube.

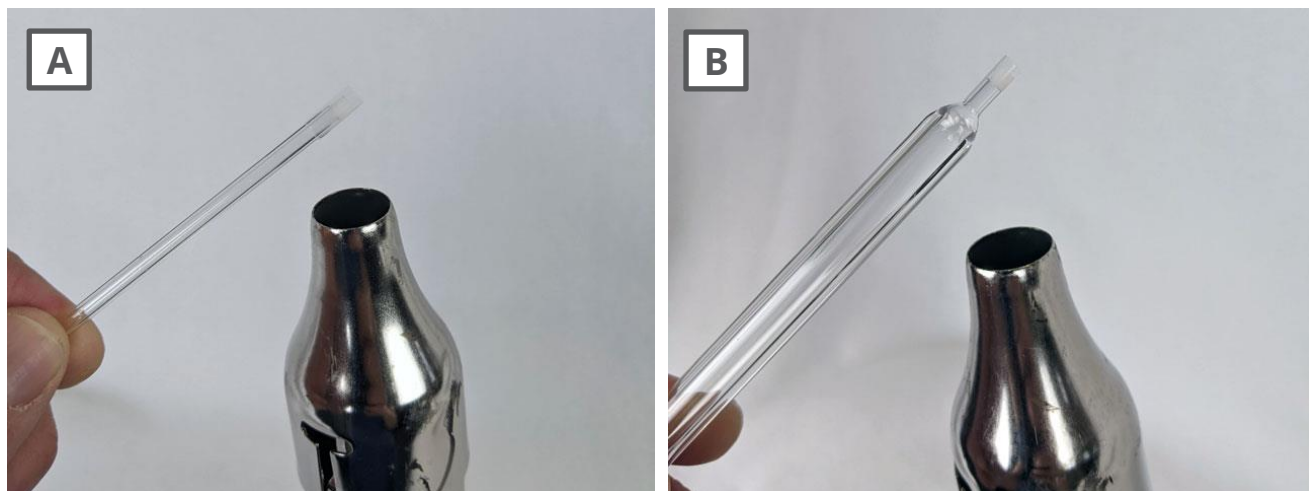


Figure 6. Step 4 of porous glass frit replacement for (A) LowProfile (AFREF003062 and AFREF003093) and (B) Standard (AFREF010192) non-aqueous reference electrodes.

2.5 Step 5: Optional: Cut excess FEP heat shrink tubing off end

This step may not be necessary, but if desired, use the thin blade to carefully and safely trim any excess length of FEP heat shrink tubing from the end of the porous glass frit and glass tube.

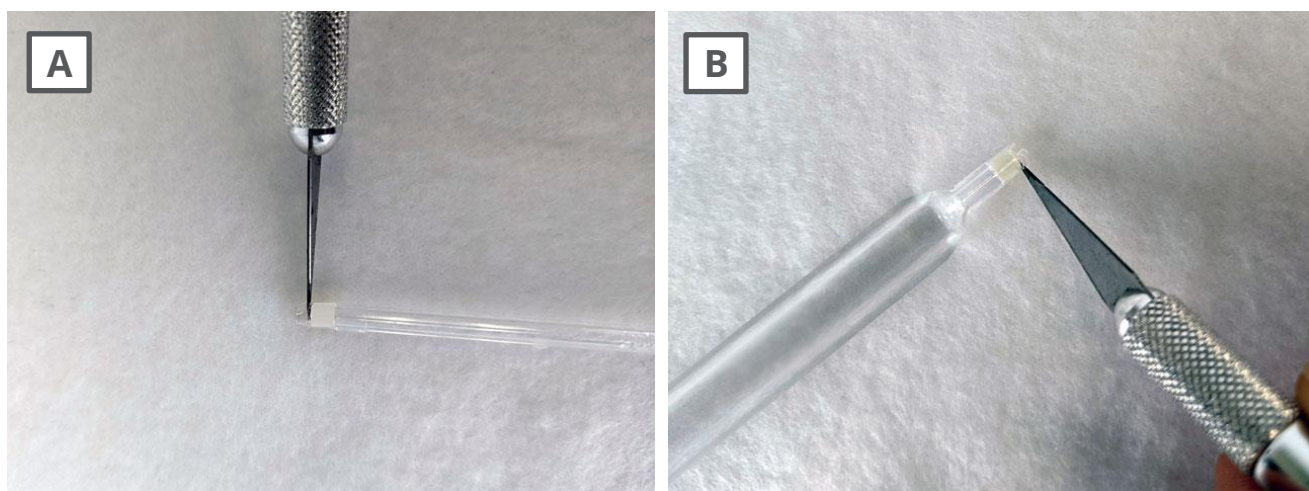


Figure 7. Step 5 of porous glass frit replacement for (A) LowProfile (AFREF003062 and AFREF003093) and (B) Standard (AFREF010192) non-aqueous reference electrodes.

3. Contact Us for Support

If you have any questions, please do not hesitate to contact us:



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