

Membrane Clamp Information for the Low Volume Separated Cell

Product Variations and Support Information

1. Introduction

The Low Volume Separated Cell (part #: AF01CKT1008) was designed for users to employ their own membrane/separator material between two halves of an electrochemical cell. When using the Spherical Joint Clamp (part #: KACP35, see: Figure 2-1), the user is limited to fairly thin separator materials ($< 1\text{ mm}$). Pine Research received feedback that the cell needs to accommodate thicker separator materials. The new Variable Thickness Clamp (part #: AC01CKT1008S01, see: Figure 3-1) is shipped as a bag of components, which require user assembly prior to use of the cell. This document provides an overview of the clamps included with the cell kit.

2. Spherical Joint Clamp

The Spherical Joint Clamp is useful with thin separator materials, $< 1\text{ mm}$ in thickness. The spherical joint clamp is simple to use. After securing the separator material between two O-rings and each cell half, simply open the spring loaded spherical clamp and carefully slide onto the glass necks of each joint half. Pressure from the clamp will seal the separator material against each O-ring (see: Figure 2-2).



Figure 2-1. Spherical Joint Clamp

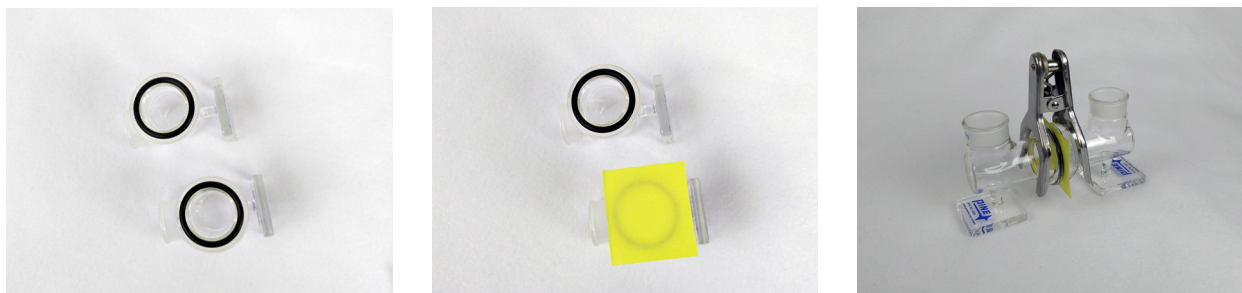


Figure 2-2. Installation of Separator and Use of the Spherical Joint with the Low Volume Separated Cell.

3. Variable Thickness Clamp

The Variable Thickness Clamp is useful with thicker separator materials, > 1 mm in thickness. The clamp requires some assembly prior to using the cell. Each half of the clamp should be installed over the glass joint prior to installing separator material. The clamp uses threaded rods and wing nuts to accommodate thicker separator materials, while still tightly sealing against each O-ring within the joint. Below are basic assembly instructions. Installation and assembly will require a 5/16" wrench, a 1/4" wrench, and a Phillips screwdriver.

3.1 Install Variable Thickness Clamp on Each Cell Half Separately

Each clamp half consists of two polycarbonate pieces. First align the two polycarbonate pieces with opposite grooves, install a 1/2" screw and washer through the hole, and tighten with a 1/4" locknut. Ideally, the locknut should be oriented on the side opposite the location that the separator will be installed. Install the polycarbonate clamp half around the glass, just behind the joint. Secure the clamp around the glass by installing a 1/2" screw and washer through the opposite (top) hole, and tightening with a 1/4" locknut as before. Repeat these installation steps on the other half of the cell (see: Figure 3-1).

**INFO:**

Do not over-tighten the locknuts when assembling the clamp. A 1/4 turn past "finger-tight" is sufficiently tight. Polycarbonate could crack if the screws are over-tightened.

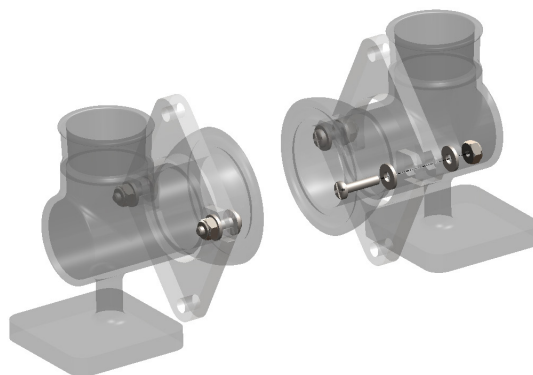


Figure 3-1. Variable Thickness Clamp Installed on Each Half of the Separated Cell

3.2 Install the Threaded Rods

On one half of the cell, insert a 2" screw through each of the side holes of the polycarbonate clamp body, such that the threaded end is oriented towards the other half of the cell (see: Figure 3-2). Thread a 5/16" nut onto the screw and tighten against the polycarbonate clamp. Repeat this for the other side of the clamp, such that both threaded rods are facing the other cell half, positioned to feed through the corresponding holes on the other half of the clamp.

**INFO:**

Do not over-tighten the nuts when assembling the rods against the polycarbonate clamps. A 1/4 turn past "finger-tight" is sufficiently tight. Polycarbonate could crack if the screws are over-tightened.

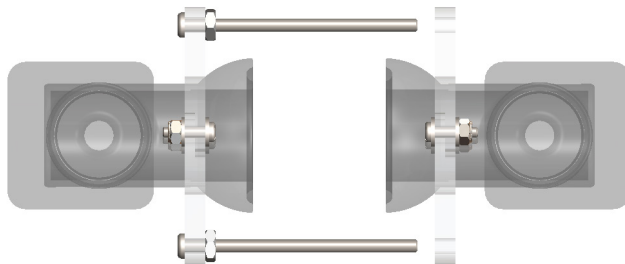


Figure 3-2. Tightening Rods Installed, Ready for Separator Material Insertion

3.3 Install Separator Material and O-rings and Tighten Clamp

With each half of the clamp assembled around the halves of the glass cell, orient the cell feet on the bench. Insert the separator material and O-rings while applying gentle pressure to each cell half using only your fingers. The O-rings will rest in the grooves of the spherical joint. Make any fine adjustments to ensure proper seating of the O-rings and placement of the separator, while gently holding the cell together. Install a wing nut to each threaded rod on the side opposite the side of screw installation. Thread the wing nuts one at a time alternating between each side, until they are holding the O-rings and separator in place without additional force. Continue tightening each wing nut, about 1-2 revolutions, until the seal is secure.

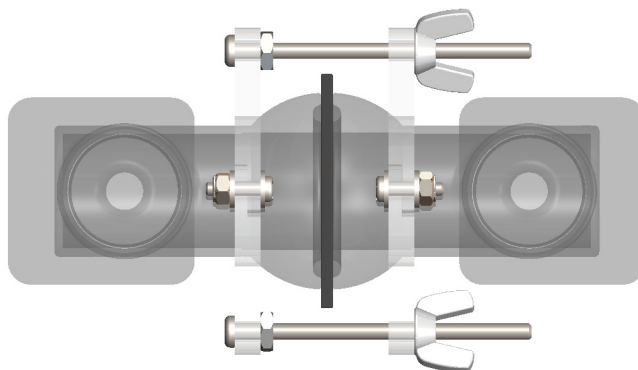


Figure 3-3. Fully Assembled Variable Thickness Clamp with Separator Material Secured Between Cell Halves



INFO:

Do not over-tighten the wing nuts when installing a separator and O-rings. The tightness need only be sufficient to hold the separator and O-rings in place and to seal against the glass joint.

4. Contact Us for Support

Should you require additional information on the use and/or assembly of the clamps shipped with the Low Volume Separated Cell, please do not hesitate to contact us.

Submit technical support requests to us by email at pinewire@pineresearch.com. Alternatively, contact us by phone at +1 (919) 782-8320. Technical Support is available Monday – Friday from 9 AM to 5 PM EST.