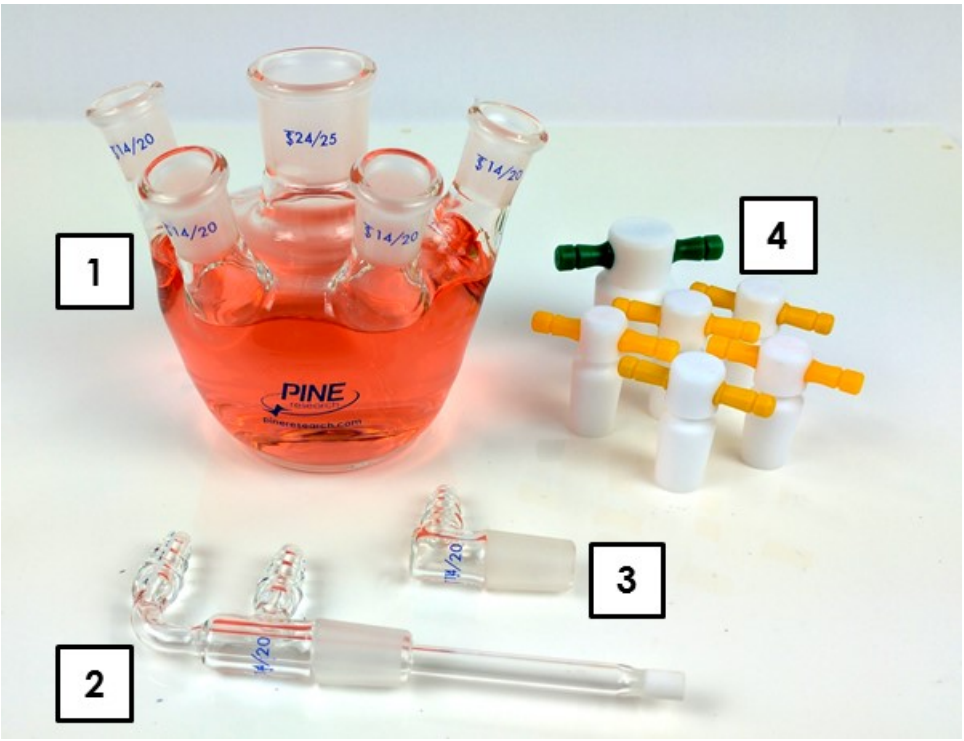
# RDE and RRDE Cell without Water Jacket Overview

*This brief product information document will describe the components of the RDE/RRDE Cell without Water Jacket and how to assemble them. The RDE/RRDE Cell without Water Jacket enables users to perform hydrodynamic electrochemical experiments in a cell capable of deaeration.*

## 1. Cell Description

The RDE/RRDE Cell without Water Jacket (part #: AKCELL2) is designed for use in rotating disk electrochemistry (RDE) and rotating ring-disk electrochemistry (RRDE) experiments. The cell easily accommodates the shaft of a rotating disk or ring-disk electrode through its center ground glass port (24/25) and provides four (14/20) ports to mount reference and counter electrodes as well as other accessories (see: Figure 1). The cell has a maximum volume of 150 $mL$, though less solution can be used as long as the electrodes are submerged.




| | | |
|---|---|---|
| 1 | **RDE/RRDE Cell without Water Jacket** | Holds the electrochemical solution; has five ports for electrode and accessory mounting |
| 2 | **Dual Port Gas Inlet** | Bubbles gas through/deaerates the cell solution; mounts any 14/20 port |
| 3 | **Single Port Gas Outlet** | Serves as the outlet for degassing or gas collection experiments; mounts any 14/20 port |
| 4 | **PTFE Stoppers** | Seal the cell; four 14/20 and one 24/25 stopper are included |

**Figure 1. RDE/RRDE Cell with Water Jacket Components**

2741 Campus Walk Avenue | Building 100 | Durham, NC 27705 | USA
Phone: +1 919.782.8320 | E-mail: pinewire@pineresearch.com | http://www.pineresearch.com

The purchase of the RDE/RRDE Cell without Water Jacket includes, the $150\,mL$ cell, four $14/20$ polytetrafluoroethylene (PTFE) stoppers, one $24/25$ PTFE stopper, and two deaeration accessories are included (see: Figure 1). The PTFE stoppers function to seal any unused ports. The two deaeration accessories (*i.e.*, the Single Port Gas Outlet and the Double Port Gas Inlet) are designed to mount a $14/20$ port and accept tubing with a $1/4''$ or $6.5\,mm$ inner diameter. The Dual Port Gas Inlet's top hose barb bubbles gas directly through the electrochemical system while the bottom hose barb blankets the solution with gas. The Single Port Gas Outlet serves as an escape for gases introduced through the Dual Port Gas Inlet or produced by the electrochemical reaction.

## 2. Optional Accessories

For RDE or RRDE studies that require an inert atmosphere, the Gas-Purged Bearing Assembly (part #: AC01TPA6M, sold separately) can be used (see: Figure 2). The bearing itself allows an electrode to rotate freely through the center port of the RDE/RRDE Cell without Water Jacket. The rest of the bearing assembly helps to maintain an inert atmosphere inside the cell in three ways. First, the bearing assembly features a $24/25$ taper joint with an O-ring that is designed to fit snugly in the center port of the cell. Second, only a precision-machined $15\,mm\,OD$ electrode shaft can be inserted into the cell through the $15.0\,mm\,ID$ hole of the bearing assembly; this minimizes space between the rotating shaft and the bearing assembly. Third, the cell is purged by applying a positive pressure of inert gas through a small port on the side of the bearing assembly.

The bearing assembly and its tapered outer body are fabricated from polyether ether ketone (PEEK), a polymer with good chemical and thermal resistance. The bearing itself is ceramic and is also resistant to chemical attack. As a result, the bearing assembly can be used in most aqueous and non-aqueous solutions (besides concentrated acids).

**NOTE:**

**PEEK is not compatible with concentrated acids. Prolonged exposure to concentrated acid will cause discoloration.**

**Figure 2. Gas-Purged Bearing Assembly**

## 3. Important Assembly Information

The RDE/RRDE Cell without Water Jacket is easy to use. Simply follow these steps:

1. Gather, prepare and/or polish (as needed) any electrodes for the experiment (electrodes sold separately)
2. Place the analyte (or blank electrolyte) solution in the RDE/RRDE Cell without Water Jacket

3. Mount the electrodes (rotating disk or rotating ring-disk in the center port, reference and/or counter in the side ports). Be certain that the solution covers the electrodes.
4. Mount any accessories for deaeration
5. Seal any open ports with PTFE stoppers and perform deaeration, if necessary
6. Connect electrodes to the potentiostat and continue with potentiostat operation to perform the experiment

**NOTE:**

**While the cell volume is $150\ mL$, less solution can be used as long as the electrodes and any accessories are adequately submerged in solution.**

**CAUTION:**

**Do not rotate RDE/RRDE electrodes faster than the suggested maximum rotation rate. Doing so may cause injury to the equipment or user.**

# 4. Disassembly Instructions

Simply perform the steps outlined in this guide in reverse order. Ensure each electrode is properly cleaned, rinsed, and stored for future use. Discard analyte solution in the proper waste container and properly clean and rinse the cell and any other accessories.

# 5. Contact Us/Support

If you have any questions or would like to inquire about the RDE/RRDE Cell without Water Jacket described in this document, please contact us via the means provided below:

## 5.1 Email

Reach us by emailing the sales team at pinewire@pineresearch.com.

## 5.2 Website

There is a contact us form on our website. There may also be additional resources (such as YouTube videos) for some of the products mentioned here: http://www.pineresearch.com/.