



AFCTR5 Kit

Platinum Counter Electrode
Product Guide

Part #: AFCTR5

Warnings



CAUTION:

Platinum wire is **FRAGILE**; the coil can break free if overextended or manipulated from the epoxy body. Do not bend, twist or force the platinum coils into an immobile surface with force.



CHEMICAL COMPATIBILITY:

Avoid long term exposure of the epoxy shroud to acetone, concentrated nitric and hydrobromic acids, concentrated hypochlorite and hydrogen peroxide.

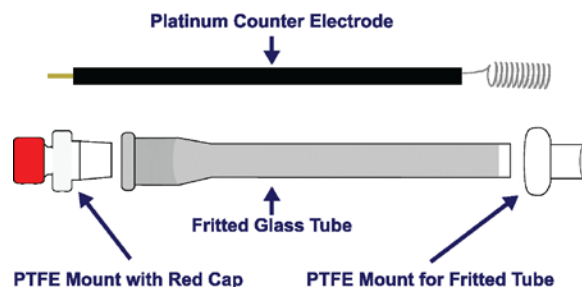


CHEMICAL COMPATIBILITY:

Alkaline solutions can attack the borosilicate in the fritted glass tube.

Description

The Coiled Platinum Counter Electrode (Part #: RRP249PT) is available as a kit (Part #: AFCTR5). It is intended for use in electrochemical systems and usually employed as one of three electrodes present within the electrochemical cell. Its design makes it flexible for many research applications. As shown below, the AFCTR5 Platinum Counter Electrode Kit consists of the **Platinum Counter Electrode**, **PTFE Mount with Red Cap** (Part #: RRP036K3), **Fritted Glass Tube** (Part #: RRP097), and a **PTFE Mount for the Fritted Tube** (Part #: ACEP1420R12).



The **Platinum Counter Electrode** features a coiled platinum wire at one end and a brass-colored contact pin at the other end of a chemically-resistant epoxy rod. The epoxy rod is resistant to many aqueous and non-aqueous solutions, though its long term exposure should be limited in acetone, concentrated nitric acid, concentrated hydrobromic acid, concentrated sodium hypochlorite, and 30% hydrogen peroxide. The platinum wire enters the electrode shroud through a PTFE port, to allow use with non-aqueous solvents for shorter periods of time without damage to the electrode.

Platinum, a fairly inert and noble metal, is a good sink for current passage across the solution to the working electrode. The surface area of the platinum coil is large enough for many electrochemical applications (see: Diagram on next page). In general, the counter electrode should have a surface area that is at least 10x larger than the surface area of the working electrode to ensure that the half reaction occurring at the working electrode is not rate limited by the half reaction occurring at the counter electrode.

The **PTFE Mount with Red Cap** (PTFE = polytetrafluoroethylene) features a 1/4" ID to fit the electrode and a male 14/20 joint for adaptation. This joint fits snugly into the female 14/20 joint of the **Fritted Glass Tube**.

The fritted glass tube is useful for experiments with reactants that produce unwanted species or gases at the counter electrode. It serves to isolate these byproducts from the bulk solution by creating a diffusional barrier. When using the fritted glass tube, avoid alkaline solutions as they can attack the borosilicate in the tube. The **PTFE Mount for the Fritted Glass Tube** has a 14/20 port to attach to an electrochemical cell. It slides the length of the fritted glass tube to accommodate any immersion depth. The glass frit in the tube is an Ace frit size D, 10 - 20 μm .

Photographs



NOTE:

Before using the electrode with a potentiostat, ensure that electrolyte solution is both inside and outside of the glass isolation tube.

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Assembling the Kit

The Platinum Counter Electrode Kit can be used with or without the Fritted Glass Isolation Tube. To use the fritted glass tube ensemble, start by sliding the PTFE Mount with Red Cap over the brass-colored contact pin of the Platinum Counter Electrode. Loosely tighten the red cap near the top of the electrode. Before placing the PTFE mount and electrode into the fritted glass tube, make sure that there is solution inside the tube. Be careful not to bump the fragile platinum coil against the bottom or sides of the glass tube as you slide the 14/20 joints of the PTFE mount and fritted glass tube together. Tighten the red cap fully. Finally, slide the PTFE Mount for the Fritted Glass Tube into place to attain the desired solution immersion depth.

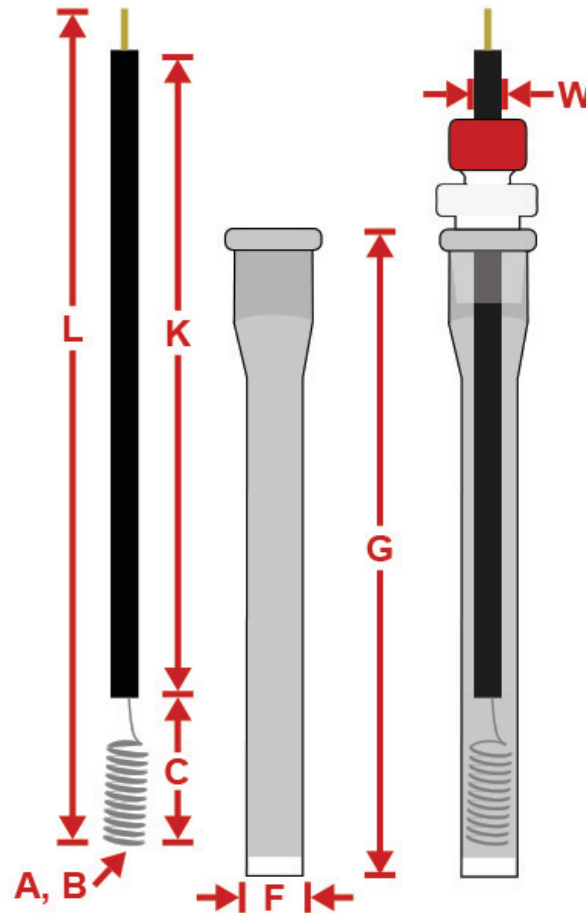
Maintenance

After every use, rinse the epoxy body and platinum coils with solvent to remove any dissolved chemicals. For aqueous systems, rinse thoroughly with deionized water. To minimize crystallization within the glass frit, be sure to thoroughly rinse both sides of the frit.

Storage

Store the platinum electrode in a dry location. Dependent upon use, it is good practice to soak and store the frit in solvent to prevent chemical contamination of future experiments.

Diagram



Overall Length (L):	180 mm
Shroud length (K):	150 mm
Shroud OD (W):	6.9 mm
Coil Surface Area (A):	4.9 cm ²
Coil OD (B):	0.5 mm
Coil Total Length (C):	30.5 ± 1 cm
Fritted Tube OD (F):	12 mm
Fritted Tube Length (G):	150 mm