E9 Series

15 mm Rotating Cylinder Electrode Product Guide

Part # Style: AFE9MBA

(accepts 15 *mm* OD, 9.5 *mm* ID cylinder inserts)

Warnings

Caution:

Maximum Rotation Rate: 4000 *RPM*.

Caution:

Use care when electrode is rotating over 2000 *RPM*.

Thermal Stability:

Use electrode from 10°*C* to 80°*C*. Extreme temperatures damage electrode seals.

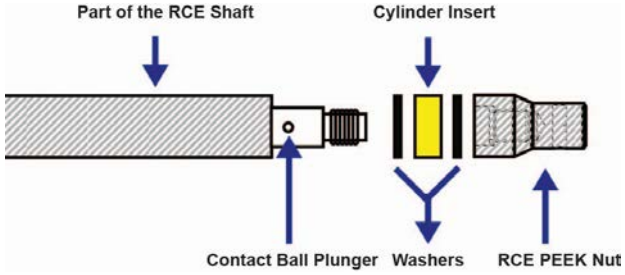
Chemical Compatibility:

The polyetheretherketone (PEEK) shroud will dissolve in concentrated acids.

Description

The E9 Series rotating cylinder electrode (RCE) is commonly used to evaluate mass transport limited corrosion. It is capable of rapidly moving a metal sample with respect to a fluid. Due to the nature of the corrosive environment in which the RCE system components are exposed, it is designed for use with the gas-purged bearing assembly (part number AC01TPA6M; see below). The bearing assembly is made from polyetheretherketone (PEEK), a polymer that is resistant to most solvents except concentrated sulfuric or nitric acid solutions. The bearing assembly is precision made to fit the 15 *mm* RCE shaft body and tapered to fit into a standard 24/25 port on an electrochemical cell.

The 15 *mm* RCE shaft connects to the MSR motorhead (part number AFMSRCE) on the 1/4" stainless steel end. At the other end of the shaft, there is a special RCE tip (see figure below). The tip is composed of four items: a **cylinder insert, two washers,** and a **RCE PEEK Nut** with a **contact ball plunger** built into the shaft.

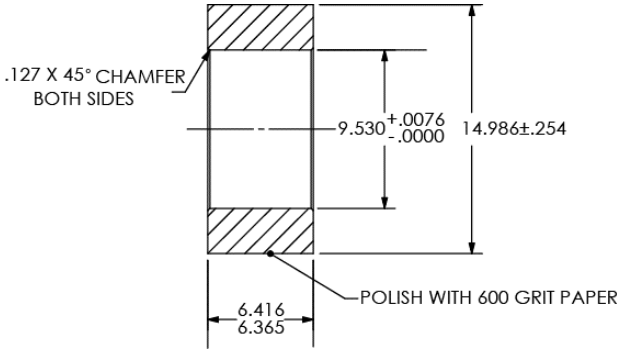


The 15 *mm* RCE tip is designed to hold a cylindrically-shaped metal sample (commonly called a **cylinder insert** or coupon, sold separately) at the lower end of the shaft. While the majority of the tip is fashioned primarily from chemically inert and electrically insulating materials (including PEEK), a metal shank is buried within the tip to provide mechanical stability and electrical contact with the metal coupon. A **contact ball plunger** holds the metal coupon into place and optimizes electrical contact. The 15 *mm* RCE shaft is shipped with twenty Viton washers. The **washers**, in conjunction with a threaded **PEEK nut**, are used to mount and seal the metal coupon onto the shaft. Additional replacement washers are available separately.

15 *mm* RCE Cylinder Inserts (Coupons)

When a cylinder insert is installed onto the 15 *mm* RCE shaft, the total metal surface area exposed to solution is 3 cm^2. Generally, the material from which the cylinder is made represents the same material whose field corrosion is the subject of RCE research.

Pine Research provides a mechanical drawing for 15 *mm* RCE cylinder inserts (see figure below, units are in *mm*) for users who choose to machine their own cylinder inserts. It is critical that cylinders be of exact dimensions. Pine Research can custom make cylinder inserts from any non-toxic materials, including starting material sent by the customer. Inquire with sales to purchase custom cylinder inserts.



Cylinder inserts are sold in packages of ten (10). Each package includes a certification sheet for the material used to manufacture the cylinder inserts. The cylinder inserts made by Pine Research are fabricated from a variety of popular steel alloys.

Assembling the RCE Shaft Tip

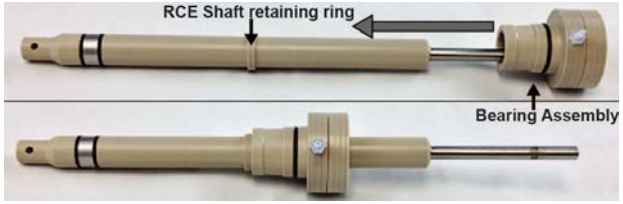
To assemble the 15 *mm* RCE shaft tip, follow the instructions below:

1. Slide a Viton washer past the threading and contact ball plunger so that it fits snuggly against the PEEK shrouding of the RCE shaft.
2. Take the cylinder insert and place it snuggly next to the washer from step 1. If done correctly, the contact ball plunger should "lock" the cylinder insert into place.
3. Place another washer flush against the cylinder insert.
4. Thread the RCE PEEK nut into place to hold the tip assembly together.

Recommended Accessory

The Gas-Purged Bearing Assembly for the 15 *mm* OD shaft is a recommended product for use with the E9 series RCE shaft. It is shown below.

The bearing assembly should be installed onto the shaft before the shaft is installed into the MSR rotator. Slide the tapered end of the bearing assembly over the 1/4" stainless steel end of the 15 *mm* RCE shaft. Continue sliding the bearing assembly down onto the PEEK shroud of the shaft (see figure below). A retaining ring on the shaft will keep the bearing assembly in place during its installation into the MSR Rotator.



Photographs

Maintenance

Due to the nature of the corrosive environment in which the RCE system components are exposed, replace coupons after every use. The Viton washers should be replaced every 2-3 uses.

Storage

The RCE shaft tip should be disassembled and corroded washers and coupons should be removed prior to storage. If the RCE PEEK nut is bound too tightly, a metal rod is included to insert into the nut head to provide extra torque.

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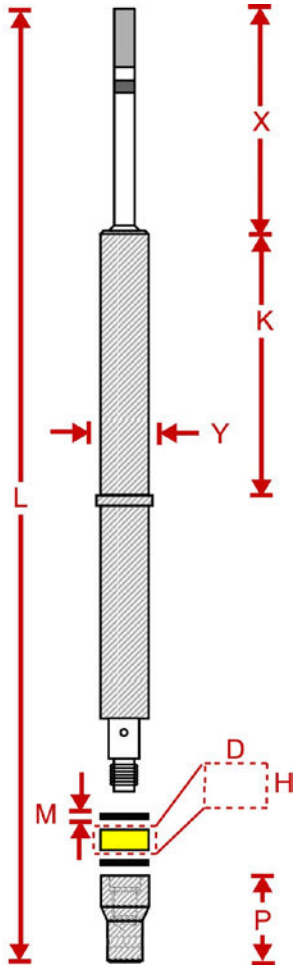
Schematic



Cylinder Diameter (D):	15.0 *mm*
Cylinder Height (H):	6.50 *mm*
RCE PEEK Nut Length (P):	27.1 *mm*
Washer Thickness (M):	1.60 *mm*
Overall Length (L):	258.8 *mm*
Upper Shaft OD (Y):	17.5 *mm*
Upper Shaft Length (X):	69.9 *mm*
Working Length (K):	82.6 *mm*