Inorganic Phosphorus (Ascorbic Acid Method)
For Anion Exchange Membranes (i.e., resin strips)
96-well plate method

Reagents

Solution A (2.5 M H$_2$SO$_4$)
*In 250 ml volumetric flask*
Fill flask half-way with DI water
35 ml Sulfuric acid (18M H$_2$SO$_4$)
Mix well, bring to volume with DI water

Solution B
*In 250 ml volumetric flask*
Fill flask half-way with DI water
10 g Ammonium molybdate
Mix well, bring to volume with DI water

Solution C
*In 100 ml volumetric flask*
50 ml DI water
0.2728 g Antimony potassium tartrate
Bring to volume with DI water

Working Solution - Use within a day or flush with N$_2$ for cold storage
*In 50 ml volumetric flask*
25 ml Solution A
7.5 ml Solution B
0.264 g Ascorbic acid (1 M C$_6$H$_8$O$_6$)
2.5 ml Solution C
Bring to volume with DI water

Working Standard
*In 100 ml volumetric flask*
50 ml 0.5 M HCl (i.e. matrix)
2.5 ml Certified standard P solution (1,000 ppm)
Bring to volume to make a 25 ppm working standard.

Standard Dilutions
*In 15 ml centrifuge tube*
1 ppm 0.4 ml standard, 9.6 ml matrix
5 ppm 2.0 ml standard, 8.0 ml matrix
10 ppm 4.0 ml standard, 6.0 ml matrix

Procedure
*In a clear 96-well plate (2:1 dilution)*
200 µl Solution (in 0.5 M HCl) using the single channel electronic pipette into 4 wells.
100 µl Using the 8-channel pipette, add working solution directly into the well to mix the solution.

Using the same procedure as above, add the three (3) standards to the last three columns in the plate. Incubate between 18 and 24 hours (Make sure standards are linear). Read absorbance at 880 nm.
**Charging AEM (Anion Exchange Membranes)**

*In 250 ml Flask*

- 150 ml 0.5 M NaHCO₃
- AEM strips

Rapidly shake for 15 minutes

Remove strips and place AEM in another flask  
Rinse AEM with DI water three (3) times.  
Immediately use or store at 5 °C

**In situ soil phosphorus (Field deployment)**

*Prep work*

Use a large syringe needle to poke a hole in a corner  
Thread Firewire finishing line and tie. Have at least 20 cm of loose line.  
Place AEM inside a plastic bag with the treads taped on the outside of the bag  
Keep moist and cool

*In the field*

Remove O horizon by hand  
Using a 1” putty knife, insert into the soil at an angle to a vertical depth of 5 cm  
Slide the AEM into the hole and press the soil back to make contact  
Tie the end of the line to a pin flag

Keep in the field between one (1) and two (2) weeks

Place each individual AEM, or grouped within a plot (3), into a small bottle or plastic bag.  
Keep moist with DI water & remove the thread

**Extraction**

Clean off any loose debris with DI water (squirt bottle)

*In 150 ml Flask*

Place each AEM (or group of AEM) in the flask  
25 ml 0.5 M HCl  
Shake for four (4) hours  
Analyze extract for anions (i.e. Phosphate) – See above

**Readily Available Soil Phosphorus (Resin P)**

*In 50 ml centrifuge tube*

- 10 g Field fresh soil  
- 25 ml DI water  
- 1 Charged AEM strip

Shake for four (4) hours  
Take out strip and rinse to remove debris, and place into another 50 ml centrifuge tube  
Follow extraction procedure