

## **615-3170 (10-607) Electric Fields Apparatus**

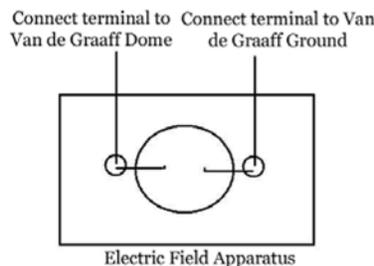
### **Introduction:**

Our Electric Field Apparatus is designed to show the lines of an electric field produced by a large electrostatic charge, such as the ones generated by a Van de Graaff Generator or Wimshurst Machine. The Electric Fields Apparatus is a cost effective demonstration, and is great for classroom use. It can be viewed close up or it can be placed on an overhead projector for viewing by an entire class. The 10-607 comes with six electrodes, in four different shapes. This allows for a wide variety of differently shaped fields to be viewed. The dome of the common Van de Graaff generator has a net positive charge because of the absence of electrons; the earth ground terminal has a net negative charge because of the surplus of electrons. This causes the iron particles to align themselves in the liquid paraffin to produce a viewable field. The polarity of the generator is not significant for this purpose; a negatively charged dome will also work.

### **How to Use:**

#### **Two Single Point Electrodes:**

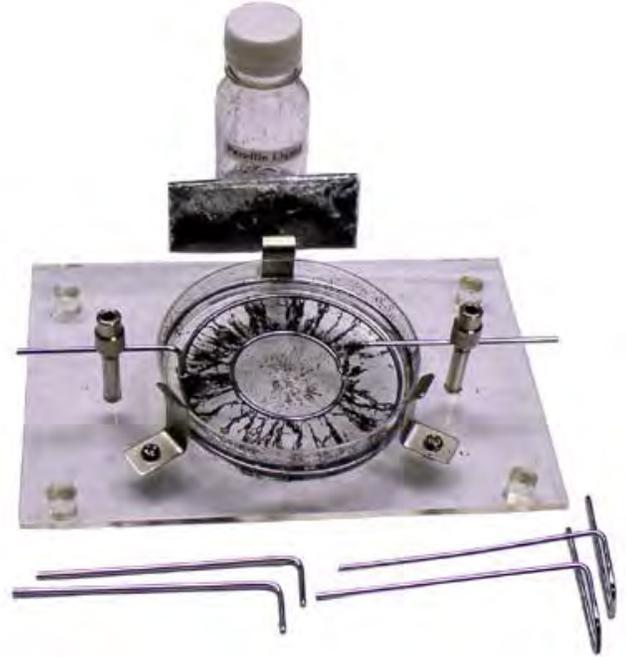
1. Place the apparatus on a flat surface or on an overhead projector for class viewing.
2. Pour about 5mm of mineral oil (paraffin) into the Petri dish.
3. Insert the Petri dish between the locating posts on the base of the apparatus.
4. Mount the single point electrodes on the terminal pillars (the ones that look like an elongated "L" shape).
5. Tighten the nuts to secure them (between the terminal head and the terminal base). The points of the electrode should be immersed just under the surface of the paraffin.
6. Connect the circuit to the Van de Graaff generator or Wimshurst Machine as follows:



7. Connect the dome of the Van de Graaff (or positive side) to an electrode, and connect the other electrode to the earth ground terminal of the Van de Graaff generator (or negative side) as seen in the picture.
8. Sprinkle a small amount of iron shavings onto the paraffin and turn on the Van de Graaff generator.
9. The lines of force should easily be seen as circular patterns forming around the points of the electrodes, and a line forming directly between them. If no image is being produced, double check the circuit and adjust the electrode's positions in the paraffin.
10. Be sure to ground the Van de Graaff generator at the completion of each demonstration.
11. To watch the effect become reversed, reverse the polarity of the apparatus. Switch the two connections from the Van de Graaff generator or Wimshurst Machine.

#### **Parallel Electrodes:**

1. Connect the parallel electrodes to either side of the apparatus (the electrodes with multiple right angle bends).
2. Align the electrode bars so that they are parallel to each other in the paraffin.
3. Connect a Van de Graaff generator or Wimshurst Machine as described before. Connect one terminal to the dome (or positive side), and one terminal to the earth ground (or negative side).
4. The lines of force will appear evenly across the void between the electrodes, showing an evenly distributed force.
5. To watch the effect become reversed, reverse the polarity of the apparatus. Switch the two connections from the Van de Graaff generator or Wimshurst Machine.



**One parallel electrode and one Point electrode:**

1. Connect a point electrode on one side and a parallel electrode on the other side as in earlier demonstrations.
2. Position the point electrode so that it is pointing perpendicular to the center of the parallel electrode.
3. Connect a Van de Graaff generator or Wimshurst Machine as described before. Connect one terminal to the dome (or positive side), and one terminal to the earth ground (or negative side).
4. The lines of force will appear in almost a rainbow shape from the two ends of the parallel electrode.
5. To watch the effect become reversed, reverse the polarity of the apparatus. Switch the two connections from the Van de Graaff generator or Wimshurst Machine.

**Ring Electrodes:**

1. Connect the Large circular electrode to the apparatus.
2. Connect the small ring electrode to the opposite side and position it inside the large ring.
3. Adjust the two rings until there is an equal amount of space between them all the way around.
4. Connect a Van de Graaff generator or Wimshurst Machine as described before. Connect one terminal to the dome (or positive side), and one terminal to the earth ground (or negative side).
5. The lines of force will appear aligning themselves perpendicular to the rings.

**Additional Demonstrations:**

Any number of additional demonstrations may be created by using any other combinations of electrodes; such as one ring electrode and one point electrode, or one ring electrode and one parallel electrode. Forming unique shapes out of heavy gauge wire and using them as electrodes in the 10-607 Electric Fields Apparatus can create additional demonstrations.

**Science First Van de Graaff Generators:**

The Electric fields apparatus can be used with any Van de Graaff generator or Wimshurst machine. Science First<sup>®</sup> offers several applicable models and accessories:

615-3100 Van de Graaff generator 200 KV

615-3130 Van de Graaff generator 400 KV

Go to [www.sciencefirst.com](http://www.sciencefirst.com) for the full product line of teaching products and fun science demonstrations.

**Warranty and Parts:**

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.