

HOLLOW CYLINDER MODEL N-142

This electrostatic accessory is used with the Van de Graaff Generator or other electrostatic source to show that an electric charge lies on the outer surface of a charged body. There is no charge on inner surfaces such as the inside of a pipe.

The Model N-142 has small, lightweight balls suspended by thread which are located both above and inside a short length of tubing. When the tubing is charged, the balls touching its outside surface will also become charged and will immediately be repelled away from the cylinder. The two balls hanging inside the cylinder will be seen to be unaffected by the charge.

Turn the Van de Graaff Generator on and bring the dome up to voltage and then turn the motor off. Touch the metal ball on top of the hollow cylinder to the dome and immediately the pith balls will be repelled. You may now move the hollow cylinder to another location and the balls will remain in the repelled position until the charge leaks off.

Carefully bring a pointed metal object held in your hand close to one of the pith balls. An unfolded paper clip will do nicely. This action will drain the charge from the ball and it will fall, again touching the side of the cylinder. It is, of course, recharged and pops right back to the repelled position. When handling the "pointed object", do not bring it near the cylinder or it will be discharged.

And now back to the earlier suggestion to turn the Van de Graaff Generator off before charging the hollow cylinder. You must remember that, when the Van de Graaff Generator is running, it is part of what might be called a dynamic system. The dome will simply increase in charge until it spills over to ground with an arc or leaks its charge into the surrounding air. This does, in fact, happen and the ionized air near the dome is strongly repelled away from the dome.



This is a very noticeable air movement which can easily be shown by holding a candle flame near the dome. This air movement is often called the electric wind. When the Van de Graaff Generator is turned off, the dome voltage immediately subsides and the wind stops. As long as the electric wind is blowing it interferes with charging of the pith balls.

While lots of things may be happening outside the cylinder, the two little balls inside the tube are quite unaffected by the electric charge. This is because the electrons attempt to get as far from each other as possible and this can only be on the outside surface of a conductor.