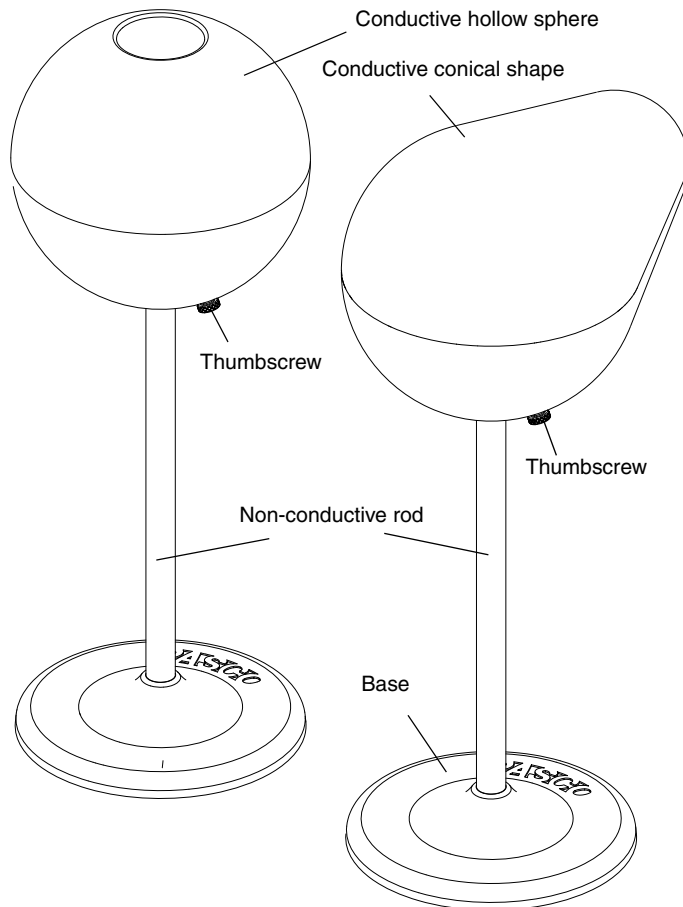




Conductive Shapes

ES-9061



Introduction

The PASCO ES-9061 Conductive Shapes are special objects upon which to store electrical charges. Both shapes are made of nickel-plated ABS plastic. The Conductive Hollow Sphere is 13 centimeters (cm) in diameter and has a 3.8 cm (1.5 inch) diameter hole at the top that allows access to the inside of the sphere. The Conductive Conical Shape is spherical on one side and tapers to a bulbous shape on the other side. Each is mounted on a non-conductive rod of polycarbonate (about 10^{14} ohms) and attached to a stable support base. Each shape has a thumbscrew terminal on the lower half of the shape for attaching a ground cable or a lead from a voltage source.

Features

The Conductive Hollow Sphere allows you to measure the amount of charge on the *inside* of a charged conductive sphere.

The Conductive Conical Shape allows you to measure the difference in charge density from one end to the other of the shape and compare the distribution of charge density to that of a charged conductive sphere.

Usage

NOTE: When handling the conductive shapes, take care to keep each shape and non-conductive rod free of dirt, grease, and fingerprints to minimize leakage of charge from the shapes.

Recommended Equipment*

- Faraday Ice Pail (ES-9042A)
- Basic Electrometer (ES-9078)
- Electrostatics Voltage Source (ES-9077)
- Charge Producers and Proof Plane (ES-9057B)

Related Equipment*

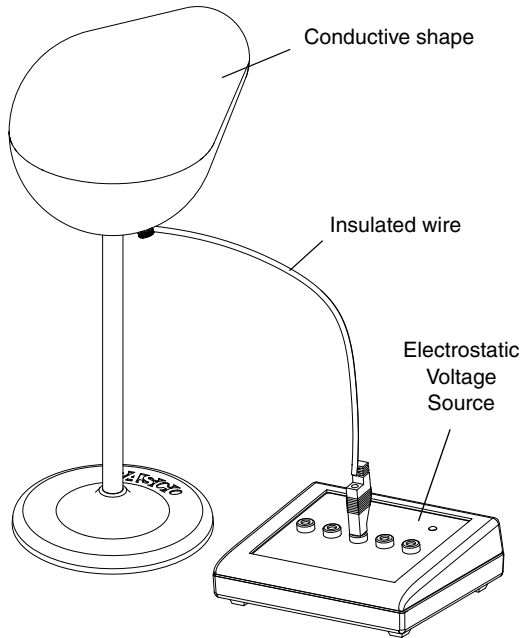
- Conductive Spheres (ES-9059B)

*See the PASCO catalog or web site at www.pasco.com for more information.

Operation with a Voltage Source

To use the conductive shapes with the PASCO ES-9077 Electrostatics Voltage Source, connect one of the high voltage power supply output terminals (+1000 V, +2000 V, +3000 V) to the thumbscrew terminal on the lower half of the conductive shape.

Note that the voltage source accessories include two banana-plug-to-spade-lug insulated wires.

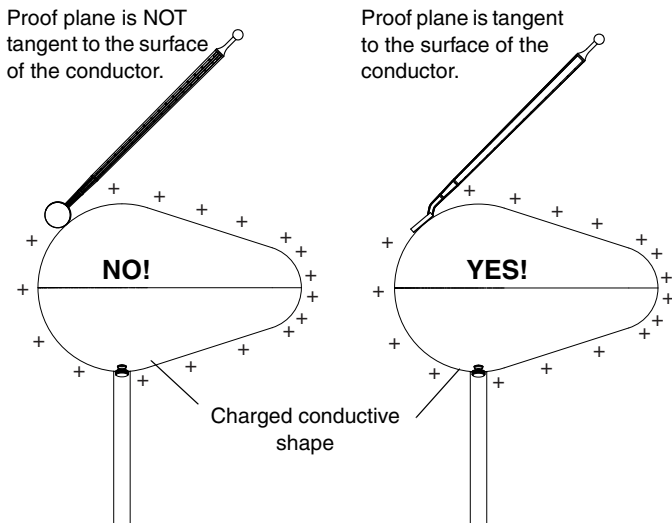


If you are using the PASCO ES-9078 Basic Electrometer to measure voltage, connect the electrometer ground terminal (GROUND) to the black ground terminal on the voltage source.

Using a Proof Plane to Sample Charge on the Conical Shape

Is the charge density uniform on the surface of a conductive conical shape, or does it vary from the larger rounded end, through the tapered area, to the smaller rounded end?

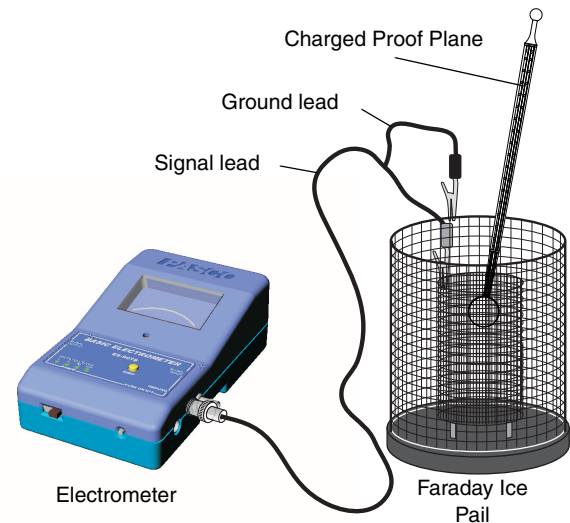
The proof plane that is a part of the PASCO ES-9057B Charge Producers and Proof Plane can be used to transfer charge from the surface of a conductive shape. Place the proof plane so that its disk is tangent to the surface of the conductive shape..



Is the charge density at the larger rounded end greater than, the same as, or less than the charge density in the tapered area? Is the charge density in the tapered area greater than, the same as, or

less than the charge density in the smaller rounded end? Is the charge density in the larger rounded end greater than, the same as, or less than the charge density in the smaller rounded end?

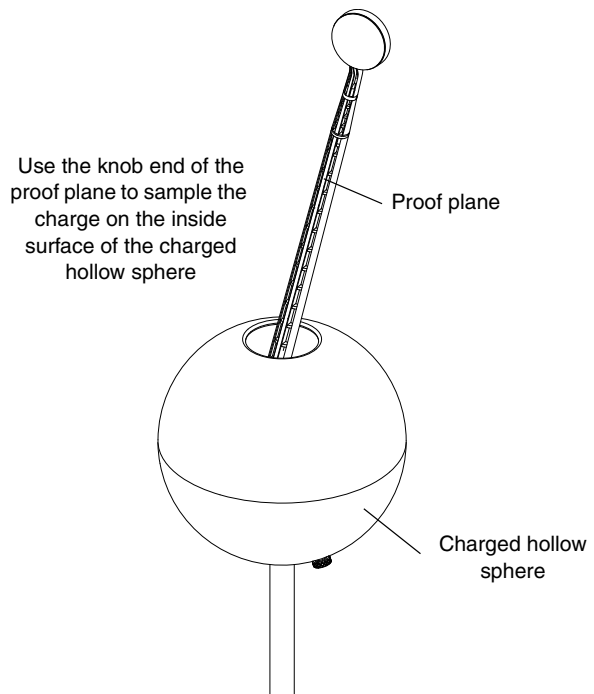
NOTE: You can then use a PASCO Basic Electrometer and a Faraday Ice Pail (ES-9042A) to measure the charge density on the proof plane, as shown in the following illustration.



By touching the proof plane to a surface, it will acquire the same charge distribution as the surface. By measuring the charge on the proof plane, the charge density on the surface can be determined. The greater the charge on the proof plane, the greater the charge density on the surface where the proof plane made contact.

Using a Proof Plane to Sample Charge inside the Hollow Sphere

Use the knob on the end of the proof plane to sample the charge on the inside surface of the hollow sphere.



Remember to lower the charged knob end of the proof plane into the Faraday Ice Pail in order to measure the charge density inside the hollow sphere.

Is the charge density on the inside of the hollow sphere greater than, the same as, or less than the charge density on the outside of the hollow sphere? Or, is the charge density inside the conductor equal to zero?

Cleaning the Shapes

When necessary, clean the conductive shape and the non-conductive rod with rubbing (isopropyl) alcohol.

Warning! Do not use acetone to clean the conductive shape or the non-conductive rod!

Technical Support

For assistance with any PASCO product, contact PASCO at:

Address: PASCO scientific
10101 Foothills Blvd.
Roseville, CA 95747-7100

Phone: 916-786-3800 (worldwide)
800-772-8700 (U.S.)

Fax: (916) 786-7565

Web: www.pasco.com

Email: support@pasco.com

For more information about the Conductive Shapes and the latest revision of this Instruction Sheet, visit:

www.pasco.com/go?ES-9061

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