

**Instruction Sheet
for the PASCO
Model ES-9057B**

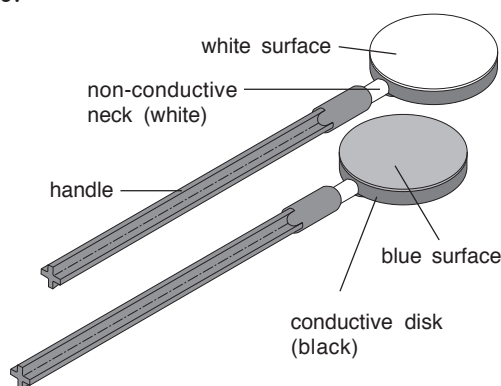
CHARGE PRODUCERS AND PROOF PLANE

Introduction

The PASCO ES-9057B Charge Producers and Proof Plane are electrostatic components for use with additional equipment from the PASCO Electrostatics System ES-9062B. The two charge producers are used to generate equal positive and negative charges by contact. The proof plane can be used to measure charge density on a charged object.

The Charge Producers

The charge producers consist of two wands, one with blue and one with white material attached to a conductive disk. Briskly rub the blue and white surfaces of the two charge producers together. The disk with the white surface will acquire a positive charge; the disk with the blue surface will acquire a negative charge. Rub the white surface of the one charge producers against the proof plane. The white disk will acquire a negative charge, while the disk of the charge producers will acquire a positive charge.



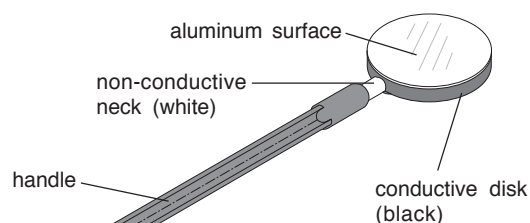
► **NOTE:** Oil build-up on the non-conductive neck can affect results. Clean with alcohol before using.

- If a zero charge is desirable, discharge the charge producers by touching the conductive disk and handle to ground. To be sure the disk and handle is fully discharged, gently breathe on the non conductive neck. The moisture from your breath will help remove any stray charge.
- Avoid touching the neck during normal use. The oils from your hands will provide a path for charges to leak off. Occasionally clean the disk surfaces and the neck with alcohol.
- When you first use the charge producers, or just after cleaning, they may not produce charges readily. Rub the white surface vigorously on the conductive disk of the proof plane

► **NOTE:** The charge producers are designed to be used with an electrometer (ES-9054B). They do not produce sufficient charge for use with a standard electroscope.

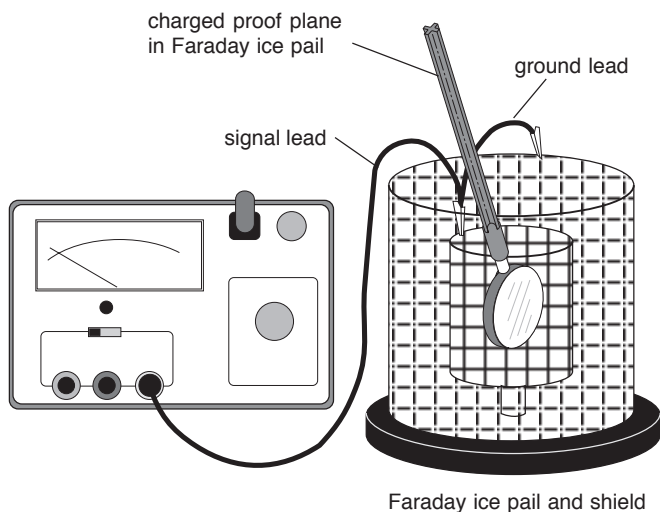
The Proof Plane

The proof plane is an aluminum-covered conductive disk attached to an insulated handle. It is used to sample the charge density on charged conductive surfaces.



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► **NOTE:** You can then use an electrometer and a Faraday ice pail (ES-9042A) to measure the charge density on the proof plane, as shown in the following illustration.

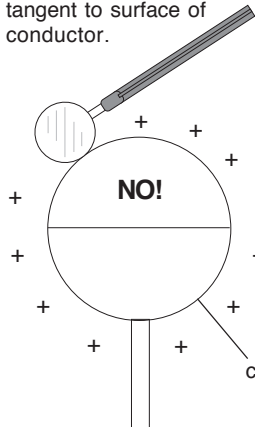


By touching the proof plane to a surface, it will acquire the same charge distribution as the surface. By measuring the charge on the proof plane, the charge density on the surface can be determined. The greater the charge on the proof plane, the greater the charge density on the surface where the proof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

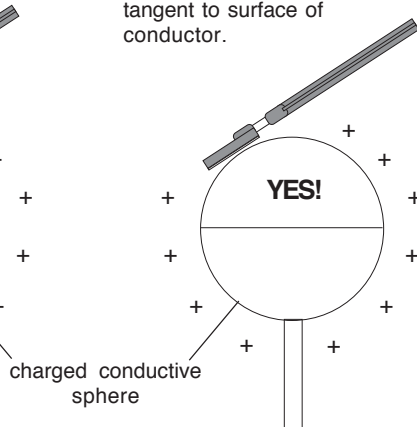
When the proof plane is touched to a conductor, the proof plane becomes part of the conductive surface. If the effect on the shape of the surface is significant, the sampling of the charge density will not be accurate. Therefore, always touch the proof plane to the conductor in such a way as to minimize the distortion of the conductive surface. The following illustration shows the recommended method for using the proof plane to sample the charge on a conductive sphere.

► **NOTE:** To accurately sample charge density, the conductor should be considerably larger than the disk of the proof plane and have a relatively large radius of curvature at the point from which the sample is taken. However, the proof plane can be used to test for charge polarity on conductors of any shape.

Proof plane disk IS NOT tangent to surface of conductor.



Proof plane disk IS tangent to surface of conductor.



Other

The conductive disk material is carbon-filled black polycarbonate (about $10^3 \Omega$) with an aluminum disk. The nonconductive neck is white polycarbonate (about $10^{14} \Omega$).

Limited Warranty

PASCO scientific warrants the product to be free from defects in materials and workmanship for a period of one year from the date of shipment to the customer. PASCO will repair or replace, at its option, any part of the product which is deemed to be defective in material or workmanship. The warranty does not cover damage to the product caused by abuse or improper use.

Determination of whether a product failure is the result of a manufacturing defect or improper use by the customer shall be made solely by PASCO scientific. Responsibility for the return of equipment for warranty repair belongs to the customer. Equipment must be properly packed to prevent damage and shipped postage or freight prepaid. (Damage caused by improper packing of the equipment for return shipment will not be covered by the warranty.) Shipping costs for returning the equipment after repair will be paid by PASCO scientific.

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