

# *Student Experiments*

Manual

## **ELECTROSTATICS**

P9160-5S



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# SEPARATION OF CHARGE BY ELECTROSTATIC INDUCTION AND NEUTRALIZATION

ESS 3.3

**Required Kit:**  
P9902-5S Electrostatics



**Material:**  
1x Plastics bar  
1x Acrylic bar with drilling  
2x Electroscopes  
2x Insulating block with sockets  
1x Aluminium bar

Cotton cloth



# SEPARATION OF CHARGE BY ELECTROSTATIC INDUCTION AND NEUTRALIZATION

ESS 3.3

This experiment is to investigate the effects of a charged PVC-bar or an acrylic glass bar on their surroundings.

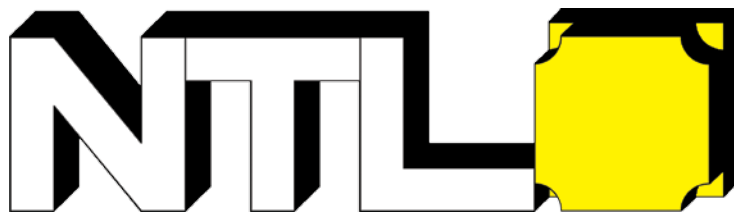
**Preparation:** The aluminium-bar is inserted in the cross hole of the acrylic glass bar so that the acrylic glass bar may serve as a supporting strap for the aluminium-bar. This combination of an acrylic glass bar and aluminium-bar is called a „discharger“. The two electroscope straps are inserted in the blocks with socket. The indicators for the electroscope are suspended from the straps. The metallic straps for the electroscopes are touched by hand to make sure that they are not electrically charged. The two electroscopes are placed in such a way that the discharger can be laid over the metal straps.

**1. Experiment:** The PVC-bar is rubbed with a woollen cloth (or a pullover). The charged PVC-bar is moved towards one of the two electroscopes without touching it. Both electroscopes indicate an electrical charge. If the PVC-bar is removed the two electroscopes indicate nothing.

The charged PVC-bar is moved again towards one of the electroscopes. The discharger is removed while the PVC-bar is still near the electroscope. Then the PVC-bar is removed. The two electroscopes continue to indicate a charge. Since the charge cannot have been caused by the charged PVC-bar (it has not touched the electroscope!), it can only have been produced by the shifting of existing charges within the two conductively connected electroscopes. The indicated charges are investigated in the second experiment.

**2. Experiment:** The two electroscopes indicating a nearly equally high charge are again connected with the discharger. Both electroscopes stop indicating charges immediately. The charges of both electroscopes obviously did have different signs, so that a compensation of charge occurred through the conductive connection, and both electroscopes were again uncharged. This led to a neutralization of charges.

**Conclusion:** Electrical charges are shifted in conductive materials (electroscope with discharger) if they are close to an electrically charged body (PVC-bar). If the connection between the two now differently charged ends of a body made of conductive material is separated as long as the body is still near at hand, two differently charged bodies come into being. Should there be a conductive connection between those bodies, neutralization occurs. The ability of a charged body to separate charges is called electrostatic induction.



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